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COMMITTEE
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**REPORT OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE
ON ITS SEVENTY-THIRD SESSION**

Attached are annexes 1 to 18 to the report of the Marine Environment Protection Committee on its seventy-third session (MEPC 73/19).

LIST OF ANNEXES

- ANNEX 1 RESOLUTION MEPC.305(73) – AMENDMENTS TO MARPOL ANNEX VI (PROHIBITION ON THE CARRIAGE OF NON-COMPLIANT FUEL OIL FOR COMBUSTION PURPOSES FOR PROPULSION OR OPERATION ON BOARD A SHIP)
- ANNEX 2 RESOLUTION MEPC.306(73) – AMENDMENTS TO THE GUIDELINES FOR BALLAST WATER MANAGEMENT AND DEVELOPMENT OF BALLAST WATER MANAGEMENT PLANS (G4) (RESOLUTION MEPC.127(53))
- ANNEX 3 RESOLUTION MEPC.307(73) – 2018 GUIDELINES FOR THE DISCHARGE OF EXHAUST GAS RECIRCULATION (EGR) BLEED-OFF WATER
- ANNEX 4 DRAFT AMENDMENTS TO THE NO_x TECHNICAL CODE 2008 (ELECTRONIC RECORD BOOKS AND CERTIFICATION REQUIREMENTS FOR SCR SYSTEMS)
- ANNEX 5 RESOLUTION MEPC.308(73) – 2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS
- ANNEX 6 DRAFT AMENDMENTS TO MARPOL ANNEX VI (ELECTRONIC RECORD BOOKS AND EEDI REGULATIONS FOR ICE-STRENGTHENED SHIPS)
- ANNEX 7 RESOLUTION MEPC.309(73) – AMENDMENTS TO THE 2014 GUIDELINES ON SURVEY AND CERTIFICATION OF THE ENERGY EFFICIENCY DESIGN INDEX (EEDI) (RESOLUTION MEPC.254(67), AS AMENDED BY RESOLUTION MEPC.261(68))
- ANNEX 8 UNIFIED INTERPRETATIONS OF REGULATIONS 2.9, 5.4.5, 22.2, 22.3, 22A.1, 22A.8 AND APPENDIX IX OF MARPOL ANNEX VI
- ANNEX 9 PROGRAMME OF FOLLOW-UP ACTIONS OF THE INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS UP TO 2023
- ANNEX 10 RESOLUTION MEPC.310(73) – ACTION PLAN TO ADDRESS MARINE PLASTIC LITTER FROM SHIPS
- ANNEX 11 DRAFT AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)
- ANNEX 12 DRAFT AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (BCH CODE)

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- ANNEX 13 DRAFT AMENDMENTS TO MARPOL ANNEX II (CARGO RESIDUES AND TANK WASHINGS OF PERSISTENT FLOATING PRODUCTS)
- ANNEX 14 RESOLUTION MEPC.311(73) – 2018 GUIDELINES FOR THE APPLICATION OF MARPOL ANNEX I REQUIREMENTS TO FLOATING PRODUCTION, STORAGE AND OFFLOADING FACILITIES (FPSOS) AND FLOATING STORAGE UNITS (FSUS)
- ANNEX 15 DRAFT AMENDMENTS TO MARPOL ANNEXES I, II AND V (ELECTRONIC RECORD BOOKS)
- ANNEX 16 STATUS OF OUTPUTS OF THE COMMITTEE FOR THE 2018-2019 BIENNIUM
- ANNEX 17 ITEMS TO BE INCLUDED IN THE AGENDAS OF MEPC 74 AND MEPC 75
- ANNEX 18 STATEMENTS BY DELEGATIONS AND OBSERVERS

ANNEX 1

**RESOLUTION MEPC.305(73)
(adopted on 26 October 2018)**

**AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1997 TO AMEND THE
INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM
SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO**

Amendments to MARPOL Annex VI

**(Prohibition on the carriage of non-compliant fuel oil for combustion purposes for
propulsion or operation on board a ship)**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto (MARPOL), which specifies the amendment procedure and confers upon the appropriate body of the Organization the function of considering amendments thereto for adoption by the Parties,

HAVING CONSIDERED, at its seventy-third session, proposed amendments to MARPOL Annex VI concerning the prohibition on the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to MARPOL Annex VI, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article 16(2)(f)(iii) of MARPOL, that the amendments shall be deemed to have been accepted on 1 September 2019 unless, prior to that date, not less than one third of the Parties or Parties the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have communicated to the Organization their objection to the amendments;

3 INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of MARPOL, the said amendments shall enter into force on 1 March 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article 16(2)(e) of MARPOL, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to MARPOL;

5 REQUESTS FURTHER the Secretary-General to transmit copies of the present resolution and its annex to Members of the Organization which are not Parties to MARPOL.

ANNEX

AMENDMENTS TO MARPOL ANNEX VI

(Prohibition on the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship)

ANNEX VI

REGULATIONS FOR THE PREVENTION OF AIR POLLUTION FROM SHIPS

Regulation 14

Sulphur oxides (SO_x) and particulate matter

General requirements

1 Paragraph 1 is replaced by the following:

"1 The sulphur content of fuel oil used or carried for use on board a ship shall not exceed 0.50% m/m."

Requirements within emission control areas

2 Paragraph 3 is replaced by the following:

"3 For the purpose of this regulation, an emission control area shall be any sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in appendix III to this Annex. The emission control areas under this regulation are:

- .1 the Baltic Sea area as defined in regulation 1.11.2 of Annex I of the present Convention;
- .2 the North Sea area as defined in regulation 1.14.6 of Annex V of the present Convention;
- .3 the North American Emission Control Area, which means the area described by the coordinates provided in appendix VII to this Annex; and
- .4 the United States Caribbean Sea Emission Control Area, which means the area described by the coordinates provided in appendix VII to this Annex."

3 Paragraph 4 is replaced by the following:

"4 While a ship is operating within an emission control area, the sulphur content of fuel oil used on board that ship shall not exceed 0.10% m/m."

4 The subtitle "Review provision" and paragraphs 8, 9 and 10 are deleted.

Appendix I

Form of International Air Pollution Prevention (IAPP) Certificate (Regulation 8)

Supplement to International Air Pollution Prevention Certificate (IAPP Certificate)

5 Paragraphs 2.3.1 and 2.3.2 are replaced by the following and a new paragraph 2.3.3 is added as follows:

"2.3.1 When the ship operates outside of an emission control area specified in regulation 14.3, the ship uses:

- .1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.50% m/m, and/or

- .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SO_x emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.50% m/m

2.3.2 When the ship operates inside an emission control area specified in regulation 14.3, the ship uses:

- .1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.10% m/m, and/or

- .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SO_x emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.10% m/m

2.3.3 For a ship without an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6, the sulphur content of fuel oil carried for use on board the ship shall not exceed 0.50% m/m as documented by bunker delivery notes

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ANNEX 2

**RESOLUTION MEPC.306(73)
(adopted on 26 October 2018)**

**AMENDMENTS TO THE GUIDELINES FOR BALLAST WATER MANAGEMENT AND
DEVELOPMENT OF BALLAST WATER MANAGEMENT PLANS (G4)
(RESOLUTION MEPC.127(53))**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that the International Conference on Ballast Water Management for Ships held in February 2004 adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Ballast Water Management Convention) together with four Conference resolutions,

NOTING that regulation A-2 of the Ballast Water Management Convention requires that discharge of ballast water shall only be conducted through ballast water management in accordance with the provisions of the Annex to the Convention,

NOTING FURTHER that regulation B-1 of the Annex to the Ballast Water Management Convention provides that each ship shall have on board and implement a ballast water management plan approved by the Administration, taking into account Guidelines developed by the Organization,

NOTING FURTHER that, at its fifty-third session, the Committee adopted, by resolution MEPC.127(53), the *Guidelines for ballast water management and development of ballast water management plans* (G4),

HAVING CONSIDERED, at its seventy-third session, proposed amendments to the Guidelines (G4),

- 1 ADOPTS amendments to the *Guidelines for ballast water management and development of ballast water management plans*, as set out in the annex to the present resolution;
- 2 INVITES Governments to apply the Guidelines, as amended, as soon as possible;
- 3 AGREES to keep the Guidelines, as amended, under review.

ANNEX

**AMENDMENTS TO THE GUIDELINES FOR BALLAST WATER MANAGEMENT AND
DEVELOPMENT OF BALLAST WATER MANAGEMENT PLANS (G4)**

1 Paragraph 4.3 is added in part B:

"4.3 The ballast water management plan may include contingency measures developed taking into account guidelines developed by the Organization*."

* Refer to the *Guidance on contingency measures under the BWM Convention* (BWM.2/Circ.62, as may be amended).

ANNEX 3

**RESOLUTION MEPC 307(73)
(adopted on 26 October 2018)**

**2018 GUIDELINES FOR THE DISCHARGE OF EXHAUST GAS
RECIRCULATION (EGR) BLEED-OFF WATER**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its fifty-eighth session, it adopted, by resolution MEPC.176(58), a revised MARPOL Annex VI (hereinafter referred to as "MARPOL Annex VI") and, by resolution MEPC.177(58), a revised Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (hereinafter referred to as the "NO_x Technical Code 2008"),

NOTING regulation 13 of MARPOL Annex VI which makes the NO_x Technical Code 2008 mandatory under that Annex,

NOTING ALSO that the use of NO_x-reducing devices is envisaged in the NO_x Technical Code 2008 and that exhaust gas recirculation (EGR) systems are such NO_x-reducing devices for compliance with the Tier II and/or Tier III NO_x limit,

RECOGNIZING the need to develop guidelines for the discharge of EGR bleed-off water,

HAVING CONSIDERED, at its seventy-third session, draft guidelines for the discharge of EGR bleed-off water, prepared by the Sub-Committee on Pollution Prevention and Response, at its fifth session,

- 1 ADOPTS the *2018 Guidelines for the discharge of exhaust gas recirculation (EGR) bleed-off water*, as set out at annex to the present resolution;
- 2 INVITES Administrations to take the annexed Guidelines into account in developing provisions for regulating the discharge of EGR bleed-off water;
- 3 REQUESTS Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of shipowners, ship operators, shipbuilders, marine diesel engine manufacturers and any other interested parties;
- 4 AGREES to keep these Guidelines under review in light of experience gained with their application.

ANNEX

2018 GUIDELINES FOR THE DISCHARGE OF EXHAUST GAS RECIRCULATION (EGR) BLEED-OFF WATER

1 INTRODUCTION

1.1 Regulation 13.5 of MARPOL Annex VI requires marine diesel engines to meet the Tier III NO_x emission levels when operating in a NO_x Tier III emission control area in accordance with the provisions in regulations 13.5.1 and 13.5.2.

1.2 One method for reducing NO_x emissions is to use Exhaust Gas Recirculation (EGR), which is an internal engine process resulting in a NO_x reduction which will meet the requirements of the regulation. By means of this process, condensate of exhaust gas will be generated and discharged as bleed-off water, which should be handled differently depending on the fuel oil sulphur content. EGR may also be used as a Tier II compliance option.

1.3 These Guidelines cover the discharge of EGR bleed-off water. They are recommendatory in nature; however, the Administrations are invited to base their implementation on these Guidelines.

2 GENERAL

2.1 Purpose

The purpose of these Guidelines is to specify requirements for the discharge to the sea of bleed-off water when using EGR.

2.2 Application

These Guidelines should apply to a marine diesel engine fitted with an EGR device having a bleed-off water discharge arrangement, for which the EIAPP Certificate is first issued on or after 1 June 2019. It should be noted that any discharge of oil or oily mixtures into polar waters is prohibited by the Polar Code (see also paragraphs 3.1 and 3.2 of these Guidelines).

2.3 Definitions

2.3.1 "Bleed-off water" means water to be discharged directly, or via a holding tank, to the sea from an EGR water treatment system.

2.3.2 "EGC" means exhaust gas cleaning.

2.3.3 "EGCS Guidelines" means the *2015 Guidelines for exhaust gas cleaning systems* (resolution MEPC.259(68), as may be amended).

2.3.4 "EGR record book" means a record of the maintenance and servicing of the monitoring equipment required by these Guidelines. This may be met by following the relevant requirements of the EGCS Guidelines. This record would include the date, time, location and quantity of residues delivered ashore from the EGR water treatment system or may be recorded in the EGCS Record Book.

2.3.5 "Manual for EGR bleed-off discharge system" means the manual containing the system description, discharge limits and the relevant items required for Onboard Monitoring Manual (OMM) in the EGCS Guidelines or the Revised Guidelines.

2.4 Required documents

The EGR record book and manual for EGR bleed-off discharge system should be approved by the Administration. The following documents should be retained on board the ship as appropriate and should be available for surveys as required:

- .1 manual for EGR bleed-off discharge system;
- .2 certificates for type approval of oil content meters (15 ppm alarm);
- .3 operating and maintenance manuals of oil content meters (15 ppm alarm);
and
- .4 EGR record book.

3 DISCHARGE OF EGR BLEED-OFF WATER INTO THE SEA

3.1 Bleed-off water when using fuel oil not complying with the relevant limit value in regulation 14 of MARPOL Annex VI

3.1.1 The bleed-off water discharged to the sea from an EGR water treatment system may or may not be combined with the discharge water from an EGC system. In either case, this discharge to the sea should be documented, monitored and recorded, as appropriate, in accordance with the relevant requirements of the EGCS Guidelines. Upon request, the Administration should be provided with bleed-off water samples according to appendix 3 of the EGCS Guidelines, as applicable.

3.1.2 Bleed-off water which is retained onboard in a holding tank should not be discharged to the sea, except when:

- .1 the ship is en route¹ and outside polar waters,² ports, harbours or estuaries;
and
- .2 the bleed-off water discharged meets the provisions of paragraph 3.1.1.

3.2 Bleed-off water when using fuel oil complying with the relevant limit value in regulation 14 of MARPOL Annex VI

3.2.1 In case the EGR system is in operation and the sulphur content of the fuel oil used for the engine complies with regulation 14 of MARPOL Annex VI, the discharge of bleed-off water should meet the requirements of paragraph 3.1, unless the following conditions are satisfied:

- .1 the ship is en route¹ outside polar waters,² ports, harbours or estuaries;
- .2 the sulphur content of the fuel oil used for the engine when the EGR system is in operation complies with the relevant requirements of regulation 14 of MARPOL Annex VI;
- .3 the oil content meter is type approved in accordance with the annex of resolution MEPC.107(49), as amended;

¹ Refer to Unified Interpretation to regulation 15.2.1 of the revised MARPOL Annex I (MEPC 55/23, annex 18).

² Refer to the *International Code for Ships Operating in Polar Waters* (Polar Code) (resolutions MEPC.264(68) and MSC.385(94)).

- .4 the oil content of the bleed-off water discharge and 15 ppm alarm is continuously monitored and recorded; and
- .5 the oil content of the discharge does not exceed 15 ppm.

3.2.2 When the EGR system is operated in polar waters,² ports, harbours or estuaries, the discharge of bleed-off water to the sea should comply with section 3.1.

3.2.3 Bleed-off water which is retained on board in a holding tank should not be discharged to the sea, except when:

- .1 the ship is en route¹ and outside polar waters,² ports, harbours or estuaries; and
- .2 the bleed-off water discharged meets the provisions of paragraph 3.2.1.

4 RESIDUES FROM EGR WATER TREATMENT SYSTEMS

4.1 Residues from EGR water treatment systems should be delivered ashore to adequate reception facilities. Such residues should not be discharged to the sea or incinerated on board.

4.2 Each ship fitted with an EGR unit should record the storage and disposal of bleed-off water residues in an EGR record book, including the date, time and location of such storage and disposal.

5 BLEED-OFF WATER ADDITIVES

5.1 In case additives are used for enhancing the bleed-off water quality, an assessment of the additive should be performed and documented unless the below substances are used and documented with a Material Safety Data Sheet:

- .1 neutralization agent (caustic substance), such as Sodium Hydroxide (NaOH) or Sodium Carbonate (Na₂CO₃); and
- .2 flocculants, which are used for marine approved oily-water separating equipment.

5.2 For those technologies which make use of chemicals, additives, preparations or create relevant chemicals, not including those in paragraph 5.1, in situ, there should be an assessment of the bleed-off water additives. The assessment could take into account relevant guidelines such as the *Procedure for approval of ballast water management systems that make use of active substances (G9)* (resolution MEPC.169(57)), and, if necessary, additional bleed-off water discharge criteria should be established.

6 SURVEY AND CERTIFICATION

The bleed-off discharge system and the EGR record book should be subject to survey on installation and at initial, annual/intermediate and renewal surveys by the Administration. The bleed-off discharge system and the EGR record book may also be subject to inspection by port State control.

ANNEX 4

DRAFT AMENDMENTS TO THE NO_x TECHNICAL CODE 2008

(Electronic Record Books and Certification requirements for SCR systems)

Chapter 1 – General

1.3 Definitions

1 A new paragraph 1.3.20 is added as follows:

"1.3.20 *Electronic Record Book* means a device or system, approved by the Administration, used to electronically record the required entries for discharges, transfers and other operations as required under this Code in lieu of a hard copy record book.*"

Chapter 2 – Surveys and certification

2.2 Procedures for pre-certification of an engine

2 Paragraph 2.2.5.1 is replaced by the following:

".1 Where a NO_x-reducing device is to be included within the EIAPP certification, it must be recognized as a component of the engine, and its presence shall be recorded in the engine's Technical File. The applicable test procedure shall be performed and the combined engine/NO_x-reducing device shall be approved and pre-certified by the Administration taking into account Guidelines developed by the Organization**. However, the pre-certification in accordance with the procedure not involving the testing for the combined engine/NO_x-reducing device on a test bed as given by the Guidelines developed by the Organization** is subject to the limitations given in paragraph 2.2.4.2."

Chapter 6 – Procedures for demonstrating compliance with NO_x emission limits on board

6.2.2 Documentation for an engine parameter check method

3 In paragraph 6.2.2.7.1, after the words "a record book", the words "or electronic record book*" are inserted.

* Refer to the *Guidelines for the use of electronic record books under MARPOL*, adopted by resolution MEPC...(...).

** Refer to the *2017 Guidelines addressing additional aspects to the NO_x Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with selective catalytic reduction (SCR) systems*, adopted by resolution MEPC.291(71), as amended."

ANNEX 5

**RESOLUTION MEPC.308(73)
(adopted on 26 October 2018)**

2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that it adopted, by resolution MEPC.203(62), Amendments to the annex of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (inclusion of regulations on energy efficiency for ships in MARPOL Annex VI),

NOTING that the aforementioned amendments to MARPOL Annex VI entered into force on 1 January 2013,

NOTING ALSO that regulation 20 (Attained Energy Efficiency Design Index (attained EEDI)) of MARPOL Annex VI, as amended, requires that the EEDI shall be calculated taking into account the guidelines developed by the Organization,

NOTING FURTHER that the *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, adopted by resolution MEPC.212(63), and, the amendments thereto, adopted by resolution MEPC.224(64),

NOTING FURTHER that it adopted, by resolution MEPC.245(66), the *2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, and by resolutions MEPC.263(68) and MEPC.281(70), amendments thereto,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for the smooth and uniform implementation of the regulations,

HAVING CONSIDERED, at its seventy-third session, proposed *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*,

1 ADOPTS the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, as amended, as set out in the annex to the present resolution;

2 INVITES Administrations to take the aforementioned amendments into account when developing and enacting national laws which give force to and implement provisions set forth in regulation 20 of MARPOL Annex VI, as amended;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the attention of shipowners, ship operators, shipbuilders, ship designers and any other interested parties;

4 AGREES to keep these Guidelines, as amended, under review, in the light of experience gained with their implementation;

5 SUPERSEDES the *2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* adopted by resolution MEPC.245(66), as amended by resolutions MEPC.263(66) and MEPC.281(70), and MEPC.1/Circ.866.

ANNEX

**2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY
EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS**

CONTENTS

- 1 Definitions
- 2 Energy Efficiency Design Index (EEDI), including equation
 - 2.1 EEDI Formula
 - 2.2 Parameters
 - 2.2.1 C_F ; Conversion factor between fuel consumption and CO₂ emission
 - 2.2.2 V_{ref} ; Ship speed
 - 2.2.3 *Capacity*
 - 2.2.3.1 *Capacity* for bulk carriers, tankers, gas carriers, LNG carriers, ro-ro cargo ships (vehicle carriers), ro-ro cargo ships, ro-ro passenger ships, general cargo ships, refrigerated cargo carrier and combination carriers
 - 2.2.3.2 *Capacity* for passenger ships and cruise passenger ships
 - 2.2.3.3 *Capacity* for containerships
 - 2.2.4 *Deadweight*
 - 2.2.5 P ; Power of main and auxiliary engines
 - 2.2.5.1 P_{ME} ; Power of main engines
 - 2.2.5.2 P_{PTO} ; Power of Shaft generator
 - 2.2.5.3 P_{PTI} ; Power of Shaft motor
 - 2.2.5.4 P_{eff} ; Innovative mechanical energy efficient technology for main engine
 - 2.2.5.5 P_{AEff} ; Innovative mechanical energy efficient technology for auxiliary engine
 - 2.2.5.6 P_{AE} ; Power of auxiliary engines
 - 2.2.5.7 Use of electric power table
 - 2.2.6 Consistency of parameters V_{ref} , *Capacity* and P
 - 2.2.7 *SFC* ; Certified specific fuel consumption
 - 2.2.7.1 *SFC* for main and auxiliary engines
 - 2.2.7.2 *SFC* for steam turbines ($SFC_{SteamTurbine}$)
 - 2.2.8 f_j ; Ship specific design elements
 - 2.2.8.1 Power correction factor for ice-class ships
 - 2.2.8.2 Power correction factor for shuttle tankers with propulsion redundancy
 - 2.2.8.3 Correction factor for ro-ro cargo and ro-ro passenger ships (f_{jro-ro})
 - 2.2.8.4 Correction factor for general cargo ships
 - 2.2.8.5 Correction factor for other ship types
 - 2.2.9 f_w ; Factor for speed reduction at sea

- 2.2.10 f_{eff} ; Factor of each innovative energy efficiency technology
- 2.2.11 f_i ; Capacity factor for technical/regulatory limitation on capacity
 - 2.2.11.1 f_i ; Capacity correction factor for ice-class ships
 - 2.2.11.2 f_{iVSE} ; Ship specific voluntary structural enhancement
 - 2.2.11.3 f_{iCSR} ; Ships under Common Structural Rules (CSR)
 - 2.2.11.4 f_i for other ship types
- 2.2.12 f_c ; Cubic capacity correction factor
 - 2.2.12.1 f_c for chemical tankers
 - 2.2.12.2 f_c for gas carriers
 - 2.2.12.3 f_c for ro-ro passenger ships (f_{cRoPax})
 - 2.2.12.4 f_c for bulk carriers having R of less than 0.55 (f_c bulk carriers designed to carry light cargoes)
- 2.2.13 L_{pp} ; Length between perpendiculars
- 2.2.14 f_i ; Factor for general cargo ships equipped with cranes and other cargo-related gear
- 2.2.15 d_s ; Summer load line draught
- 2.2.16 B_s ; Breadth
- 2.2.17 ∇ ; Volumetric displacement
- 2.2.18 g ; Gravitational acceleration

APPENDIX 1 A generic and simplified power plant

APPENDIX 2 Guidelines for the development of electric power tables for EEDI (EPT-EEDI)

APPENDIX 3 A generic and simplified marine power plant for a cruise passenger ship having non-conventional propulsion

APPENDIX 4 EEDI calculation examples for use of dual fuel engines

1 Definitions

1.1 MARPOL means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

1.2 For the purpose of these Guidelines, the definitions in chapter 4 of MARPOL Annex VI, as amended, apply.

2 Energy Efficiency Design Index (EEDI)

2.1 EEDI Formula

The attained new ship Energy Efficiency Design Index (EEDI) is a measure of ships' energy efficiency (g/t · nm) and calculated by the following formula:

$$\frac{\left(\prod_{j=1}^n f_j \right) \left(\sum_{i=1}^{n_{ME}} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)} \right) + (P_{AE} \cdot C_{FAE} \cdot SFC_{AE}^*) + \left(\prod_{j=1}^n f_j \cdot \sum_{i=1}^{n_{PTI}} P_{PTI(i)} - \sum_{i=1}^{n_{eff}} f_{eff(i)} \cdot P_{AE_{eff}(i)} \right) C_{FAE} \cdot SFC_{AE} - \left(\sum_{i=1}^{n_{eff}} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME}^{**} \right)}{f \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref}}$$

* If part of the Normal Maximum Sea Load is provided by shaft generators, SFC_{ME} and C_{FME} may – for that part of the power – be used instead of SFC_{AE} and C_{FAE}

** In case of $P_{PTI(i)} > 0$, the average weighted value of $(SFC_{ME} \cdot C_{FME})$ and $(SFC_{AE} \cdot C_{FAE})$ to be used for calculation of P_{eff}

Note: This formula may not be applicable to a ship having diesel-electric propulsion, turbine propulsion or hybrid propulsion system, except for cruise passenger ships and LNG carriers.

2.2 Parameters

For the calculation of EEDI by the formula in paragraph 2.1, following parameters apply.

2.2.1 C_F ; Conversion factor between fuel consumption and CO₂ emission

C_F is a non-dimensional conversion factor between fuel consumption measured in g and CO₂ emission also measured in g based on carbon content. The subscripts $ME(i)$ and $AE(i)$ refer to the main and auxiliary engine(s) respectively. C_F corresponds to the fuel used when determining SFC listed in the applicable test report included in a Technical File as defined in paragraph 1.3.15 of the NO_x Technical Code ("test report included in a NO_x technical file" hereafter). The value of C_F is as follows:

Type of fuel	Reference	Lower calorific value (kJ/kg)	Carbon content	C_F (t-CO ₂ /t-Fuel)
1 Diesel/Gas Oil	ISO 8217 Grades DMX through DMB	42,700	0.8744	3.206
2 Light Fuel Oil (LFO)	ISO 8217 Grades RMA through RMD	41,200	0.8594	3.151
3 Heavy Fuel Oil (HFO)	ISO 8217 Grades RME through RMK	40,200	0.8493	3.114
4 Liquefied Petroleum Gas (LPG)	Propane	46,300	0.8182	3.000
	Butane	45,700	0.8264	3.030

5	Liquefied Natural Gas (LNG)	48,000	0.7500	2.750
6	Methanol	19,900	0.3750	1.375
7	Ethanol	26,800	0.5217	1.913

In case of a ship equipped with a dual-fuel main or auxiliary engine, the C_F -factor for gas fuel and the C_F -factor for fuel oil should apply and be multiplied with the specific fuel oil consumption of each fuel at the relevant EEDI load point. Meanwhile, gas fuel should be identified whether it is regarded as the "primary fuel" in accordance with the formula below:

$$f_{DFgas} = \frac{\sum_{i=1}^{n_{total}} P_{total(i)}}{\sum_{i=1}^{n_{gasfuel}} P_{gasfuel(i)}} \times \frac{V_{gas} \times \rho_{gas} \times LCV_{gas} \times K_{gas}}{\left(\sum_{i=1}^{n_{Liquid}} V_{liquid(i)} \times \rho_{liquid(i)} \times LCV_{liquid(i)} \times K_{liquid(i)} \right) + V_{gas} \times \rho_{gas} \times LCV_{gas} \times K_{gas}}$$

$$f_{DFliquid} = 1 - f_{DFgas}$$

where,

f_{DFgas} is the fuel availability ratio of gas fuel corrected for the power ratio of gas engines to total engines, f_{DFgas} should not be greater than 1;

V_{gas} is the total net gas fuel capacity on board in m^3 . If other arrangements, like exchangeable (specialized) LNG tank-containers and/or arrangements allowing frequent gas refuelling are used, the capacity of the whole LNG fuelling system should be used for V_{gas} . The boil-off rate (BOR) of gas cargo tanks can be calculated and included to V_{gas} if it is connected to the fuel gas supply system (FGSS);

V_{liquid} is the total net liquid fuel capacity on board in m^3 of liquid fuel tanks permanently connected to the ship's fuel system. If one fuel tank is disconnected by permanent sealing valves, V_{liquid} of the fuel tank can be ignored;

ρ_{gas} is the density of gas fuel in kg/m^3 ;

ρ_{liquid} is the density of each liquid fuel in kg/m^3 ;

LCV_{gas} is the low calorific value of gas fuel in kJ/kg ;

LCV_{liquid} is the low calorific value of liquid fuel in kJ/kg ;

K_{gas} is the filling rate for gas fuel tanks;

K_{liquid} is the filling rate for liquid fuel tanks;

P_{total} is the total installed engine power, P_{ME} and P_{AE} in kW;

$P_{gasfuel}$ is the dual fuel engine installed power, P_{ME} and P_{AE} in kW;

- .1 If the total gas fuel capacity is at least 50% of the fuel capacity dedicated to the dual fuel engines, namely $f_{DFgas} \geq 0.5$, then gas fuel is regarded as the "Primary fuel," and $f_{DFgas} = 1$ and $f_{DFliquid} = 0$ for each dual fuel engine.

- .2 If $f_{DFgas} < 0.5$, gas fuel is not regarded as the "primary fuel." The C_F and SFC in the EEDI calculation for each dual fuel engine (both main and auxiliary engines) should be calculated as the weighted average of C_F and SFC for liquid and gas mode, according to f_{DFgas} and $f_{DFliquid}$, such as the original item of $P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)}$ in the EEDI calculation is to be replaced by the formula below.

$$P_{ME(i)} \cdot (f_{DFgas(i)} \cdot (C_{FME\ pilot\ fuel(i)} \cdot SFC_{ME\ pilot\ fuel(i)} + C_{FME\ gas(i)} \cdot SFC_{ME\ gas(i)}) + f_{DFliquid(i)} \cdot C_{FME\ liquid(i)} \cdot SFC_{ME\ liquid(i)})$$

2.2.2 V_{ref} ; Ship speed

V_{ref} is the ship speed, measured in nautical miles per hour (knot), on deep water in the condition corresponding to the *capacity* as defined in paragraphs 2.2.3.1 and 2.2.3.3 (in case of passenger ships and cruise passenger ships, this condition should be summer load draught as provided in paragraph 2.2.4) at the shaft power of the engine(s) as defined in paragraph 2.2.5 and assuming the weather is calm with no wind and no waves.

2.2.3 Capacity

Capacity is defined as follows.

- 2.2.3.1 For bulk carriers, tankers, gas carriers, LNG carriers, ro-ro cargo ships (vehicle carriers), ro-ro cargo ships, ro-ro passenger ships, general cargo ships, refrigerated cargo carrier and combination carriers, deadweight should be used as *capacity*.
- 2.2.3.2 For passenger ships and cruise passenger ships, gross tonnage in accordance with the International Convention of Tonnage Measurement of Ships 1969, annex I, regulation 3, should be used as *capacity*.
- 2.2.3.3 For containerships, 70% of the deadweight (DWT) should be used as *capacity*. EEDI values for containerships are calculated as follows:

- .1 attained EEDI is calculated in accordance with the EEDI formula using 70% deadweight for *capacity*.
- .2 estimated index value in the Guidelines for calculation of the reference line is calculated using 70% deadweight as:

$$\text{Estimated Index Value} = 3.1144 \cdot \frac{190 \cdot \sum_{i=1}^{NME} P_{MEi} + 215 \cdot P_{AE}}{70\% \text{ DWT} \cdot V_{ref}}$$

- .3 parameters a and c for containerships in table 2 of regulation 21 of MARPOL Annex VI are determined by plotting the estimated index value against 100% deadweight i.e. a = 174.22 and c=0.201 were determined.
- .4 required EEDI for a new containership is calculated using 100% deadweight as:

$$\text{Required EEDI} = (1-X/100) \cdot a \cdot 100\% \text{ deadweight}^{-c}$$

where X is the reduction factor (in percentage) in accordance with table 1 in regulation 21 of MARPOL Annex VI relating to the applicable phase and size of new containership.

2.2.4 **Deadweight**

Deadweight means the difference in tonnes between the displacement of a ship in water of relative density of 1,025 kg/m³ at the summer load draught and the lightweight of the ship. The summer load draught should be taken as the maximum summer draught as certified in the stability booklet approved by the Administration or an organization recognized by it.

2.2.5 **P ; Power of main and auxiliary engines**

P is the power of the main and auxiliary engines, measured in kW. The subscripts $ME(i)$ and $AE(i)$ refer to the main and auxiliary engine(s), respectively. The summation on *i* is for all engines with the number of engines (n_{ME}) (see diagram in appendix 1).

2.2.5.1 **$P_{ME(i)}$; Power of main engines**

$P_{ME(i)}$ is 75% of the rated installed power (MCR¹) for each main engine (*i*).

For LNG carriers having diesel electric propulsion system, $P_{ME(i)}$ should be calculated by the following formula:

$$P_{ME(i)} = 0.83 \times \frac{MPP_{Motor(i)}}{\eta_{(i)}}$$

Where:

$MPP_{Motor(i)}$ is the rated output of motor specified in the certified document.

$\eta_{(i)}$ is to be taken as the product of electrical efficiency of generator, transformer, converter and motor, taking into consideration the weighted average as necessary.

The electrical efficiency, $\eta_{(i)}$, should be taken as 91.3% for the purpose of calculating attained EEDI. Alternatively, if the value more than 91.3% is to be applied, the $\eta_{(i)}$ should be obtained by measurement and verified by method approved by the verifier.

For LNG carriers having steam turbine propulsion systems, $P_{ME(i)}$ is 83% of the rated installed power ($MCR_{SteamTurbine}$) for each steam turbine (*i*).

The influence of additional shaft power take off or shaft power take in is defined in the following paragraphs.

2.2.5.2 **$P_{PTO(i)}$; Shaft generator**

In case where shaft generator(s) are installed, $P_{PTO(i)}$ is 75% of the rated electrical output power of each shaft generator. In case that shaft generator(s) are installed to steam turbine, $P_{PTO(i)}$ is 83% of the rated electrical output power and the factor of 0.75 should be replaced to 0.83.

For calculation of the effect of shaft generators two options are available:

¹ The value of MCR specified on the EIAPP certificate should be used for calculation. If the main engines are not required to have an EIAPP certificate, the MCR on the nameplate should be used.

Option 1:

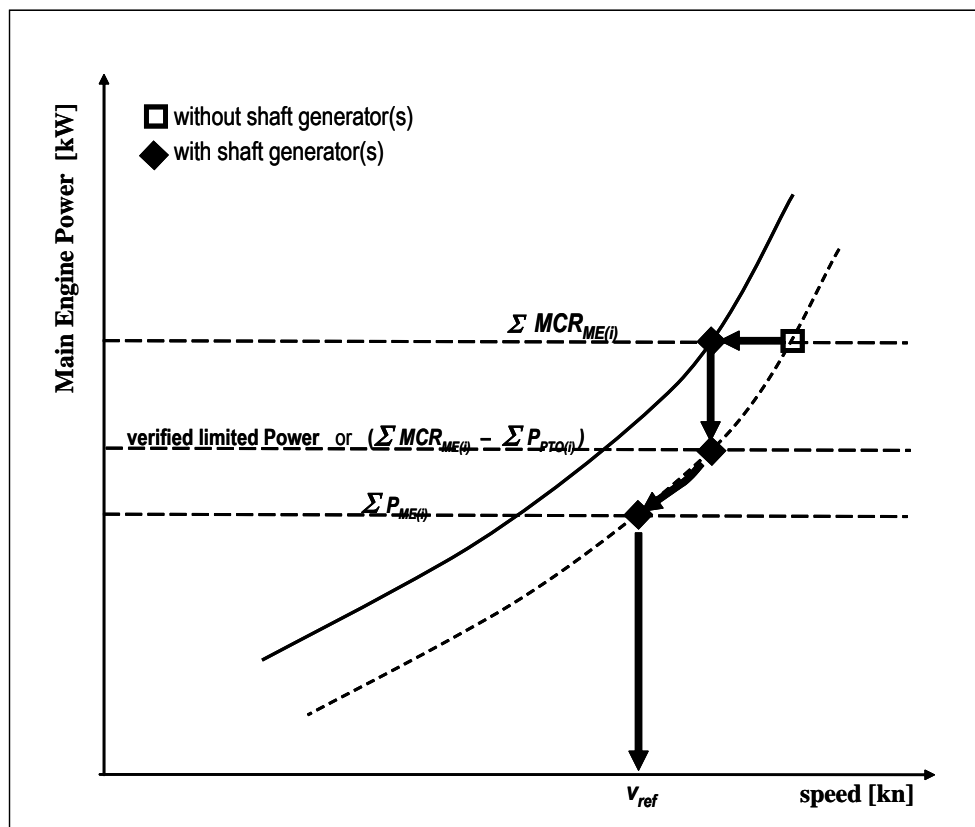
The maximum allowable deduction for the calculation of $\sum P_{ME(i)}$ is to be no more than P_{AE} as defined in paragraph 2.2.5.6. For this case, $\sum P_{ME(i)}$ is calculated as:

$$\sum_{i=1}^{nME} P_{ME(i)} = 0.75 \times \left(\sum MCR_{ME(i)} - \sum P_{PTO(i)} \right) \quad \text{with } 0.75 \times \sum P_{PTO(i)} \leq P_{AE}$$

or

Option 2:

Where an engine is installed with a higher rated power output than that which the propulsion system is limited to by verified technical means, then the value of $\sum P_{ME(i)}$ is 75% of that limited power for determining the reference speed, V_{ref} and for EEDI calculation. The following figure gives guidance for determination of $\sum P_{ME(i)}$:



2.2.5.3 $P_{PTI(i)}$; Shaft motor

In case where shaft motor(s) are installed, $P_{PTI(i)}$ is 75% of the rated power consumption of each shaft motor divided by the weighted average efficiency of the generator(s), as follows:

$$\sum P_{PTI(i)} = \frac{\sum (0.75 \cdot P_{SM,max(i)})}{\eta_{Gen}}$$

Where:

$P_{SM,max(i)}$ is the rated power consumption of each shaft motor

η_{Gen} is the weighted average efficiency of the generator(s)

In case that shaft motor(s) are installed to steam turbine, $P_{PTI(i)}$ is 83% of the rated power consumption and the factor of 0.75 should be replaced to 0.83.

The propulsion power at which V_{ref} is measured, is:

$$\sum P_{ME(i)} + \sum P_{PTI(i),Shaft}$$

Where:

$$\sum P_{PTI(i),Shaft} = \sum (0.75 \cdot P_{SM,max(i)} \cdot \eta_{PTI(i)})$$

$\eta_{PTI(i)}$ is the efficiency of each shaft motor installed

Where the total propulsion power as defined above is higher than 75% of the power the propulsion system is limited to by verified technical means, then 75% of the limited power is to be used as the total propulsion power for determining the reference speed, V_{ref} and for EEDI calculation.

In case of combined PTI/PTO, the normal operational mode at sea will determine which of these to be used in the calculation.

Note: The shaft motor's chain efficiency may be taken into consideration to account for the energy losses in the equipment from the switchboard to the shaft motor, if the chain efficiency of the shaft motor is given in a verified document.

2.2.5.4 $P_{eff(i)}$; Innovative mechanical energy efficient technology for main engine

$P_{eff(i)}$ is the output of the innovative mechanical energy efficient technology for propulsion at 75% main engine power.

Mechanical recovered waste energy directly coupled to shafts need not be measured, since the effect of the technology is directly reflected in the V_{ref} .

In case of a ship equipped with a number of engines, the C_F and SFC should be the power weighted average of all the main engines.

In case of a ship equipped with dual-fuel engine(s), the C_F and SFC should be calculated in accordance with paragraphs 2.2.1 and 2.2.7.

2.2.5.5 P_{AEff} ; Innovative mechanical energy efficient technology for auxiliary engine

$P_{AEff(i)}$ is the auxiliary power reduction due to innovative electrical energy efficient technology measured at $P_{ME(i)}$.

2.2.5.6 P_{AE} ; Auxiliary engine power

P_{AE} is the required auxiliary engine power to supply normal maximum sea load including necessary power for propulsion machinery/systems and accommodation, e.g. main engine pumps, navigational systems and equipment and living on board, but excluding the power not for propulsion machinery/systems, e.g. thrusters, cargo pumps, cargo gear, ballast pumps, maintaining cargo, e.g. reefers and cargo hold fans, in the condition where the ship engaged in voyage at the speed (V_{ref}) under the condition as mentioned in paragraph 2.2.2.

2.2.5.6.1 For ships which total propulsion power ($\sum MCR_{ME(i)} + \frac{\sum P_{PTI(i)}}{0.75}$) is 10,000 kW or above, P_{AE} is defined as:

$$P_{AE (\sum MCR_{ME(i)} \geq 10,000kW)} = \left(0.025 \times \left(\sum_{i=1}^{nME} MCR_{ME(i)} + \frac{\sum_{i=1}^{nPTI} P_{PTI(i)}}{0.75} \right) \right) + 250$$

2.2.5.6.2 For ships which total propulsion power ($\sum MCR_{ME(i)} + \frac{\sum P_{PTI(i)}}{0.75}$) is below 10,000 kW, P_{AE} is defined as:

$$P_{AE (\sum MCR_{ME(i)} < 10,000kW)} = \left(0.05 \times \left(\sum_{i=1}^{nME} MCR_{ME(i)} + \frac{\sum_{i=1}^{nPTI} P_{PTI(i)}}{0.75} \right) \right)$$

2.2.5.6.3 For LNG carriers with a reliquefaction system or compressor(s), designed to be used in normal operation and essential to maintain the LNG cargo tank pressure below the maximum allowable relief valve setting of a cargo tank in normal operation, the following terms should be added to above P_{AE} formula in accordance with 2.2.5.6.3.1, 2.2.5.6.3.2 or 2.2.5.6.3.3 as below:

.1 For ships having re-liquefaction system:

$$+ \text{CargoTankCapacity}_{LNG} \times BOR \times COP_{reliquefy} \times R_{reliquefy}$$

Where:

$\text{CargoTankCapacity}_{LNG}$ is the LNG Cargo Tank Capacity in m³.

BOR is the design rate of boil-off gas of entire ship per day, which is specified in the specification of the building contract.

$COP_{reliquefy}$ is the coefficient of design power performance for reliquefying boil-off gas per unit volume, as follows:

$$COP_{reliquefy} = \frac{425 (kg / m^3) \times 511 (kJ / kg)}{24 (h) \times 3600 (sec) \times COP_{cooling}}$$

$COP_{cooling}$ is the coefficient of design performance of reliquefaction and 0.166 should be used. Another value calculated by the manufacturer and verified by the Administration or an organization recognized by the Administration may be used.

$R_{reliquefy}$ is the ratio of boil-off gas (BOG) to be re-liquefied to entire BOG, calculated as follows:

$$R_{reliquefy} = \frac{BOG_{reliquefy}}{BOG_{total}}$$

- .2 For LNG carriers with direct diesel driven propulsion system or diesel electric propulsion system, having compressor(s) which are used for supplying high-pressured gas derived from boil-off gas to the installed engines (typically intended for 2-stroke dual fuel engines):

$$+ COP_{comp} \times \sum_{i=1}^{nME} SFC_{ME(i), gasmode} \times \frac{P_{ME(i)}}{1000}$$

Where:

COP_{comp} is the design power performance of compressor and 0.33 (kWh/kg) should be used. Another value calculated by the manufacturer and verified by the Administration or an organization recognized by the Administration may be used.

- .3 For LNG carriers with direct diesel driven propulsion system or diesel electric propulsion system, having compressor(s) which are used for supplying low-pressured gas derived from boil-off gas to the installed engines (typically intended for 4-stroke dual fuel engines):

$$+ 0.02 \times \sum_{i=1}^{nME} P_{ME(i)}^2$$

2.2.5.6.4 For LNG carriers having diesel electric propulsion system, $MPP_{Motor(i)}$ should be used instead $MCR_{ME(i)}$ for P_{AE} calculation.

2.2.5.6.5 For LNG carriers having steam turbine propulsion system and of which electric power is primarily supplied by turbine generator closely integrated into the steam and feed water systems, P_{AE} may be treated as 0(zero) instead of taking into account electric load in calculating $SFC_{SteamTurbine}$.

2.2.5.7 Use of electric power table

For ship where the P_{AE} value calculated by paragraphs 2.2.5.6.1 to 2.2.5.6.3 is significantly different from the total power used at normal seagoing, e.g. in cases of passenger ships (see NOTE under the formula of EEDI), the P_{AE} value should be estimated by the consumed electric power (excluding propulsion) in conditions when the ship is engaged in a voyage at reference speed (V_{ref}) as given in the electric power table,³ divided by the average efficiency of the generator(s) weighted by power (see appendix 2).

² With regard to the factor of 0.02, it is assumed that the additional energy needed to compress BOG for supplying to a 4-stroke dual fuel engine is approximately equal to 2% of P_{ME} , compared to the energy needed to compress BOG for supplying to a steam turbine.

³ The electric power table should be examined and validated by the verifier. Where ambient conditions affect any electrical load in the power table, such as that for heating ventilation and air conditioning systems, the contractual ambient conditions leading to the maximum design electrical load of the installed system for the ship in general should apply.

2.2.6 Consistency of parameters V_{ref} , Capacity and P

V_{ref} , Capacity and P should be consistent with each other. As for LNG carries having diesel electric or steam turbine propulsion systems, V_{ref} is the relevant speed at 83% of MPP_{Motor} or $MCR_{SteamTurbine}$ respectively.

2.2.7 SFC; Certified specific fuel consumption

SFC is the certified specific fuel consumption, measured in g/kWh, of the engines or steam turbines.

2.2.7.1 SFC for main and auxiliary engines

The subscripts $ME(i)$ and $AE(i)$ refer to the main and auxiliary engine(s), respectively. For engines certified to the E2 or E3 test cycles of the NO_x Technical Code 2008, the engine Specific Fuel Consumption ($SFC_{ME(i)}$) is that recorded in the test report included in a NO_x technical file for the engine(s) at 75% of MCR power of its torque rating. For engines certified to the D2 or C1 test cycles of the NO_x Technical Code 2008, the engine Specific Fuel Consumption ($SFC_{AE(i)}$) is that recorded on the test report included in a NO_x technical file at the engine(s) 50% of MCR power or torque rating. If gas fuel is used as primary fuel in accordance with paragraph 4.2.3 of the *Guidelines on survey and certification of the energy efficiency design index (EEDI)*, SFC in gas mode should be used. In case that installed engine(s) have no approved NO_x Technical File tested in gas mode, the SFC of gas mode should be submitted by the manufacturer and confirmed by the verifier.

The SFC should be corrected to the value corresponding to the ISO standard reference conditions using the standard lower calorific value of the fuel oil (42,700kJ/kg), referring to ISO 15550:2002 and ISO 3046-1:2002.

For ships where the P_{AE} value calculated by paragraphs 2.2.5.6.1 to 2.2.5.6.3 is significantly different from the total power used at normal seagoing, e.g. conventional passenger ships, the Specific Fuel Consumption (SFC_{AE}) of the auxiliary generators is that recorded in the test report included in a NO_x technical file for the engine(s) at 75% of MCR power of its torque rating.

SFC_{AE} is the power-weighted average among $SFC_{AE(i)}$ of the respective engines i .

For those engines which do not have a test report included in a NO_x technical file because its power is below 130 kW, the SFC specified by the manufacturer and endorsed by a competent authority should be used.

At the design stage, in case of unavailability of test report in the NO_x file, the SFC specified by the manufacturer and endorsed by a competent authority should be used.

For LNG driven engines of which SFC is measured in kJ/kWh should be corrected to the SFC value of g/kWh using the standard lower calorific value of the LNG (48,000 kJ/kg), referring to the 2006 IPCC Guidelines.

Reference lower calorific values of additional fuels are given in the table in paragraph 2.2.1 of these Guidelines. The reference lower calorific value corresponding to the conversion factor of the respective fuel should be used for calculation.

2.2.7.2 SFC for steam turbines ($SFC_{SteamTurbine}$)

The $SFC_{SteamTurbine}$ should be calculated by manufacturer and verified by the Administration or an organization recognized by the Administration as follows:

$$SFC_{SteamTurbine} = \frac{FuelConsumption}{\sum_{i=1}^{nME} P_{ME(i)}}$$

Where:

- .1 *Fuel consumption* is fuel consumption of boiler per hour (g/h). For ships of which electric power is primarily supplied by Turbine Generator closely integrated into the steam and feed water systems, not only P_{ME} but also *electric loads* corresponding to paragraph 2.2.5.6 should be taken into account.
- .2 The *SFC* should be corrected to the value of LNG using the standard lower calorific value of the LNG (48,000 kJ/kg) at SNAME Condition (condition standard; air temperature 24°C , inlet temperature of fan 38°C, sea water temperature 24°C).
- .3 In this correction, the difference of the boiler efficiency based on lower calorific value between test fuel and LNG should be taken into account.

2.2.8 f_j ; Ship specific design elements

f_j is a correction factor to account for ship specific design elements:

2.2.8.1 Power correction factor for ice-classed ships

The power correction factor, f_j , for ice-classed ships should be taken as the greater value of f_{j0} and $f_{j,min}$ as tabulated in table 1 but not greater than $f_{j,max} = 1.0$.

For further information on approximate correspondence between ice classes, see HELCOM Recommendation 25/7⁴.

Table 1: Correction factor for power f_j for ice-classed ships

Ship type	f_{j0}	$f_{j,min}$ depending on the ice class			
		IA Super	IA	IB	IC
Tanker	$\frac{17.444 \cdot DWT^{0.5766}}{\sum_{i=1}^{nME} MCR_{ME(i)}}$	$0.2488 \cdot DWT^{0.0903}$	$0.4541 \cdot DWT^{0.0524}$	$0.7783 \cdot DWT^{0.0145}$	$0.8741 \cdot DWT^{0.0079}$
Bulk carrier	$\frac{17.207 \cdot DWT^{0.5705}}{\sum_{i=1}^{nME} MCR_{ME(i)}}$	$0.2515 \cdot DWT^{0.0851}$	$0.3918 \cdot DWT^{0.0556}$	$0.8075 \cdot DWT^{0.0071}$	$0.8573 \cdot DWT^{0.0087}$
General cargo ship	$\frac{1.974 \cdot DWT^{0.7987}}{\sum_{i=1}^{nME} MCR_{ME(i)}}$	$0.1381 \cdot DWT^{0.1435}$	$0.1574 \cdot DWT^{0.144}$	$0.3256 \cdot DWT^{0.0922}$	$0.4966 \cdot DWT^{0.0583}$
Refrigerated cargo ship	$\frac{5.598 \cdot DWT^{0.696}}{\sum_{i=1}^{nME} MCR_{ME(i)}}$	$0.5254 \cdot DWT^{0.0357}$	$0.6325 \cdot DWT^{0.0278}$	$0.7670 \cdot DWT^{0.0159}$	$0.8918 \cdot DWT^{0.0079}$

⁴ HELCOM Recommendation 25/7 may be found at <http://www.helcom.fi>

Alternatively, if an ice-class ship is designed and constructed based on an open water ship with same shape and size of hull with EEDI certification, the power correction factor, f_j , for ice-classed ships can be calculated by using propulsion power of the new ice-class ship required by ice-class regulations, $P_{ice\ class}$, and the existing open water ship, P_{ow} , as follows:

$$f_j = \frac{P_{ow}}{P_{ice\ class}}$$

In this case, V_{ref} should be measured at the shaft power of the engine(s) installed on the existing open water ship as defined in paragraph 2.2.5.

2.2.8.2 Power correction factor for shuttle tankers with propulsion redundancy

The power correction factor f_j , for shuttle tankers with propulsion redundancy should be $f_j=0.77$. This correction factors applies to shuttle tankers with propulsion redundancy between 80,000 and 160,000 dwt. Shuttle tankers with propulsion redundancy are tankers used for loading of crude oil from offshore installations equipped with dual-engine and twin-propellers need to meet the requirements for dynamic positioning and redundancy propulsion class notation.

2.2.8.3 Correction factor for ro-ro cargo and ro-ro passenger ships (f_{jRoRo})

For ro-ro cargo and ro-ro passenger ships f_{jRoRo} is calculated as follows:

$$f_{jRoRo} = \frac{1}{F_{nL}^\alpha \cdot \left(\frac{L_{pp}}{B_s}\right)^\beta \cdot \left(\frac{B_s}{d_s}\right)^\gamma \cdot \left(\frac{L_{pp}}{\nabla^{1/3}}\right)^\delta} \quad ; \quad \text{If } f_{jRoRo} > 1 \text{ then } f_j = 1$$

where the Froude number, F_{nL} , is defined as:

$$F_{nL} = \frac{0.5144 \cdot V_{ref}}{\sqrt{L_{pp} \cdot g}}$$

and the exponents α, β, γ and δ are defined as follows:

Ship type	Exponent:			
	α	β	γ	δ
Ro-ro cargo ship	2.00	0.50	0.75	1.00
Ro-ro passenger ship	2.50	0.75	0.75	1.00

2.2.8.4 Correction factor for general cargo ships

The factor f_j for general cargo ships is calculated as follows:

$$f_j = \frac{0.174}{Fn_{\nabla}^{2.3} \cdot C_b^{0.3}} \quad ; \quad \text{If } f_j > 1 \text{ then } f_j = 1$$

Where

$$Fn_{\nabla} = \frac{0.5144 \cdot V_{ref}}{\sqrt{g \cdot \nabla^{\frac{1}{3}}}} \quad ; \quad \text{If } Fn_{\nabla} > 0.6 \text{ then } Fn_{\nabla} = 0.6$$

and

$$C_b = \frac{\nabla}{L_{pp} \cdot B_s \cdot d_s}$$

2.2.8.5 Correction factor for other ship types

For other ship types, f_j should be taken as 1.0.

2.2.9 f_w ; Factor for speed reduction at sea

f_w is a non-dimensional coefficient indicating the decrease of speed in representative sea conditions of wave height, wave frequency and wind speed (e.g. Beaufort Scale 6), and is determined as follows:

2.2.9.1 for the attained EEDI calculated under regulations 20 and 21 of MARPOL Annex VI, f_w is 1.00;

2.2.9.2 when f_w is calculated according to the subparagraph 2.2.9.2.1 or 2.2.9.2.2 below, the value for attained EEDI calculated by the formula in paragraph 2.1 using the obtained f_w should be referred to as "*attained EEDI_{weather}*";

2.2.9.2.1 f_w can be determined by conducting the ship specific simulation on its performance at representative sea conditions. The simulation methodology should be based on the Guidelines developed by the Organization⁴ and the method and outcome for an individual ship should be verified by the Administration or an organization recognized by the Administration; and

2.2.9.2.2 In cases where a simulation is not conducted, f_w should be taken from the "Standard f_w " table/curve. A "Standard f_w " table/curve is provided in the Guidelines⁵ for each ship type defined in regulation 2 of MARPOL Annex VI, and expressed as a function of capacity (e.g. deadweight). The "Standard f_w " table/curve is based on data of actual speed reduction of as many existing ships as possible under the representative sea condition.

2.2.9.3 f_w and *attained EEDI_{weather}*, if calculated, with the representative sea conditions under which those values are determined, should be indicated in the EEDI Technical File to distinguish it from the attained EEDI calculated under regulations 20 and 21 of MARPOL Annex VI.

⁵ Refer to *Interim Guidelines for the calculation of the coefficient f_w for decrease in ship speed in a representative sea condition for trial use*, approved by the Organization and circulated by MEPC.1/Circ.796.

2.2.10 $f_{eff(i)}$; Factor of each innovative energy efficiency technology

$f_{eff(i)}$ is the availability factor of each innovative energy efficiency technology. $f_{eff(i)}$ for waste energy recovery system should be one (1.0)⁶.

2.2.11 f_i ; Capacity factor for technical/regulatory limitation on capacity

f_i is the capacity factor for any technical/regulatory limitation on capacity, and should be assumed to be one (1.0) if no necessity of the factor is granted.

2.2.11.1 Capacity correction factor for ice-classed ships

The capacity correction factor, f_i , for ice-classed ships having DWT as the measure of capacity should be calculated as follows:

$$f_i = f_{i(ice\ class)} \cdot f_{iC_b}$$

where $f_{i(ice\ class)}$ is the capacity correction factor for ice-strengthening of the ship, which can be obtained from Table 2 and f_{iC_b} is the capacity correction factor for improved ice-going capability, which should not be less than 1.0 and which should be calculated as follows:

$$f_{iC_b} = \frac{C_{b\ reference\ design}}{C_b}$$

where $C_{b\ reference\ design}$ is the average block coefficient for the ship type, which can be obtained from Table 3 for bulk carriers, tankers and general cargo ships, and C_b is the block coefficient of the ship. For ship types other than bulk carriers, tankers and general cargo ships,

$$f_{iC_b} = 1.0.$$

⁶ EEDI calculation should be based on the normal seagoing condition outside Emission Control Area designated under regulation 13.6 of MARPOL ANNEX VI.

Table 2: Capacity correction factor for ice-strengthening of the hull

Ice class ⁷	$f_{i(ice\ class)}$
IC	$f_{i(IC)} = 1.0041 + 58.5/DWT$
IB	$f_{i(IB)} = 1.0067 + 62.7/DWT$
IA	$f_{i(IA)} = 1.0099 + 95.1/DWT$
IA Super	$f_{i(IAS)} = 1.0151 + 228.7/DWT$

Table 3: Average block coefficients $C_{b\ reference\ design}$ for bulk carriers, tankers and general cargo ships

Ship type	Size categories				
	below 10,000 DWT	10,000 – 25,000 DWT	25,000 – 55,000 DWT	55,000 – 75,000 DWT	above 75,000 DWT
Bulk carrier	0.78	0.80	0.82	0.86	0.86
Tanker	0.78	0.78	0.80	0.83	0.83
General cargo ship	0.80				

Alternatively, the capacity correction factor for ice-strengthening of the ship ($f_{i(ice\ class)}$) can be calculated by using the formula given for the ship specific voluntary enhancement correction coefficient ($f_{i\ VSE}$) in paragraph 2.2.11.2. This formula can also be used for other ice classes than those given in Table 2.

2.2.11.2 $f_{i\ VSE}$ ⁸ ; Ship specific voluntary structural enhancement

$f_{i\ VSE}$ for ship specific voluntary structural enhancement is expressed by the following formula:

$$f_{i\ VSE} = \frac{DWT_{reference\ design}}{DWT_{enhanced\ design}}$$

where:

$$DWT_{reference\ design} = \Delta_{ship} - lightweigh\ t_{reference\ design}$$

$$DWT_{enhanced\ design} = \Delta_{ship} - lightweigh\ t_{enhanced\ design}$$

For this calculation the same displacement (Δ) for reference and enhanced design should be taken.

DWT before enhancements ($DWT_{reference\ design}$) is the deadweight prior to application of the structural enhancements. DWT after enhancements ($DWT_{enhanced\ design}$) is the deadweight following the application of voluntary structural enhancement. A change of material (e.g. from

⁷ For further information on approximate correspondence between ice classes, see HELCOM Recommendation 25/7, which can be found at <http://www.helcom.fi>

⁸ Structural and/or additional class notations such as, but not limited to, "strengthened for discharge with grabs" and "strengthened bottom for loading/unloading aground", which result in a loss of deadweight of the ship, are also seen as examples of "voluntary structural enhancements".

aluminum alloy to steel) between reference design and enhanced design should not be allowed for the f_i VSE calculation. A change in grade of the same material (e.g. in steel type, grades, properties and condition) should also not be allowed.

In each case, two sets of structural plans of the ship should be submitted to the verifier for assessment. One set for the ship without voluntary structural enhancement; the other set for the same ship with voluntary structural enhancement (alternatively, one set of structural plans of the reference design with annotations of voluntary structural enhancement should also be acceptable). Both sets of structural plans should comply with the applicable regulations for the ship type and intended trade.

2.2.11.3 f_{iCSR} ; Ships under the Common Structural Rules (CSR)

For bulk carriers and oil tankers, built in accordance with the Common Structural Rules (CSR) of the classification societies and assigned the class notation CSR, the following capacity correction factor f_{iCSR} should apply:

$$f_{iCSR} = 1 + (0.08 \cdot LWT_{CSR} / DWT_{CSR})$$

Where DWT_{CSR} is the deadweight determined by paragraph 2.2.4 and LWT_{CSR} is the light weight of the ship.

2.2.11.4 f_i for other ship types

For other ship types, f_i should be taken as one (1.0).

2.2.12 f_c ; Cubic capacity correction factor

f_c is the cubic capacity correction factor and should be assumed to be one (1.0) if no necessity of the factor is granted.

2.2.12.1 f_c for chemical tankers

For chemical tankers, as defined in regulation 1.16.1 of MARPOL Annex II, the following cubic capacity correction factor f_c should apply:

$$f_c = R^{-0.7} - 0.014, \text{ where } R \text{ is less than } 0.98$$

or

$$f_c = 1.000, \text{ where } R \text{ is } 0.98 \text{ and above;}$$

where: R is the capacity ratio of the deadweight of the ship (tonnes) as determined by paragraph 2.2.4 divided by the total cubic capacity of the cargo tanks of the ship (m^3).

2.2.12.2 f_c for gas carriers

for gas carriers having direct diesel driven propulsion system constructed or adapted and used for the carriage in bulk of liquefied natural gas, the following cubic capacity correction factor f_{cLNG} should apply:

$$f_{cLNG} = R^{-0.56}$$

where: R is the capacity ratio of the deadweight of the ship (tonnes) as determined by paragraph 2.2.4 divided by the total cubic capacity of the cargo tanks of the ship (m^3).

Note: This factor is applicable to LNG carriers defined as gas carriers in regulation 2.26 of MARPOL Annex VI and should not be applied to LNG carriers defined in regulation 2.38 of MARPOL Annex VI.

2.2.12.3 f_c for ro-ro passenger ships (f_{cRoPax})

For ro-ro passenger ships having a DWT/GT-ratio of less than 0.25, the following cubic capacity correction factor, f_{cRoPax} , should apply:

$$f_{cRoPax} = \left(\frac{(DWT/GT)}{0.25} \right)^{-0.8}$$

Where DWT is the Capacity and GT is the gross tonnage in accordance with the International Convention of Tonnage Measurement of Ships 1969, annex I, regulation 3.

2.2.12.4 f_c for bulk carriers having R of less than 0.55 ($f_{c \text{ bulk carriers designed to carry light cargoes}}$)

For bulk carriers having R of less than 0.55 (e.g. wood chip carriers), the following cubic capacity correction factor, $f_{c \text{ bulk carriers designed to carry light cargoes}}$, should apply:

$$f_{c \text{ bulk carriers designed to carry light cargoes}} = R^{-0.15}$$

where R is the capacity ratio of the deadweight of the ship (tonnes) as determined by paragraph 2.2.4 divided by the total cubic capacity of the cargo holds of the ship (m³).

2.2.13 L_{pp} ; Length between perpendiculars

Length between perpendiculars, L_{pp} , means 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel, or the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that were greater. In ships designed with a rake of keel the waterline on which this length is measured should be parallel to the designed waterline. L_{pp} should be measured in metres.

2.2.14 f_l ; Factor for general cargo ships equipped with cranes and cargo-related gear

f_l is the factor for general cargo ships equipped with cranes and other cargo-related gear to compensate in a loss of deadweight of the ship.

$$f_l = f_{cranes} \cdot f_{sideloader} \cdot f_{ro-ro}$$

$$\begin{aligned} f_{cranes} &= 1 && \text{If no cranes are present.} \\ f_{sideloader} &= 1 && \text{If no side loaders are present.} \\ f_{ro-ro} &= 1 && \text{If no ro-ro ramp is present.} \end{aligned}$$

Definition of f_{cranes} :

$$f_{cranes} = 1 + \frac{\sum_{n=1}^n (0.0519 \cdot SWL_n \cdot Reach_n + 32.11)}{Capacity}$$

where:

SWL = Safe Working Load, as specified by crane manufacturer in metric tonnes

Reach = Reach at which the Safe Working Load can be applied in metres
N = Number of cranes

For other cargo gear such as side loaders and ro-ro ramps, the factor should be defined as follows:

$$f_{\text{sideloader}} = \frac{\text{Capacity}_{\text{No sideloaders}}}{\text{Capacity}_{\text{sideloaders}}}$$

$$f_{\text{RoRo}} = \frac{\text{Capacity}_{\text{No RoRo}}}{\text{Capacity}_{\text{RoRo}}}$$

The weight of the side loaders and ro-ro ramps should be based on a direct calculation, in analogy to the calculations as made for factor f_{ivse} .

2.2.15 d_s ; Summer load line draught

Summer load line draught, d_s is the vertical distance, in metres, from the moulded baseline at mid-length to the waterline corresponding to the summer freeboard draught to be assigned to the ship.

2.2.16 B_s ; Breadth

Breadth, B_s , is the greatest moulded breadth of the ship, in metres, at or below the load line draught, d_s .

2.2.17 ∇ ; Volumetric displacement

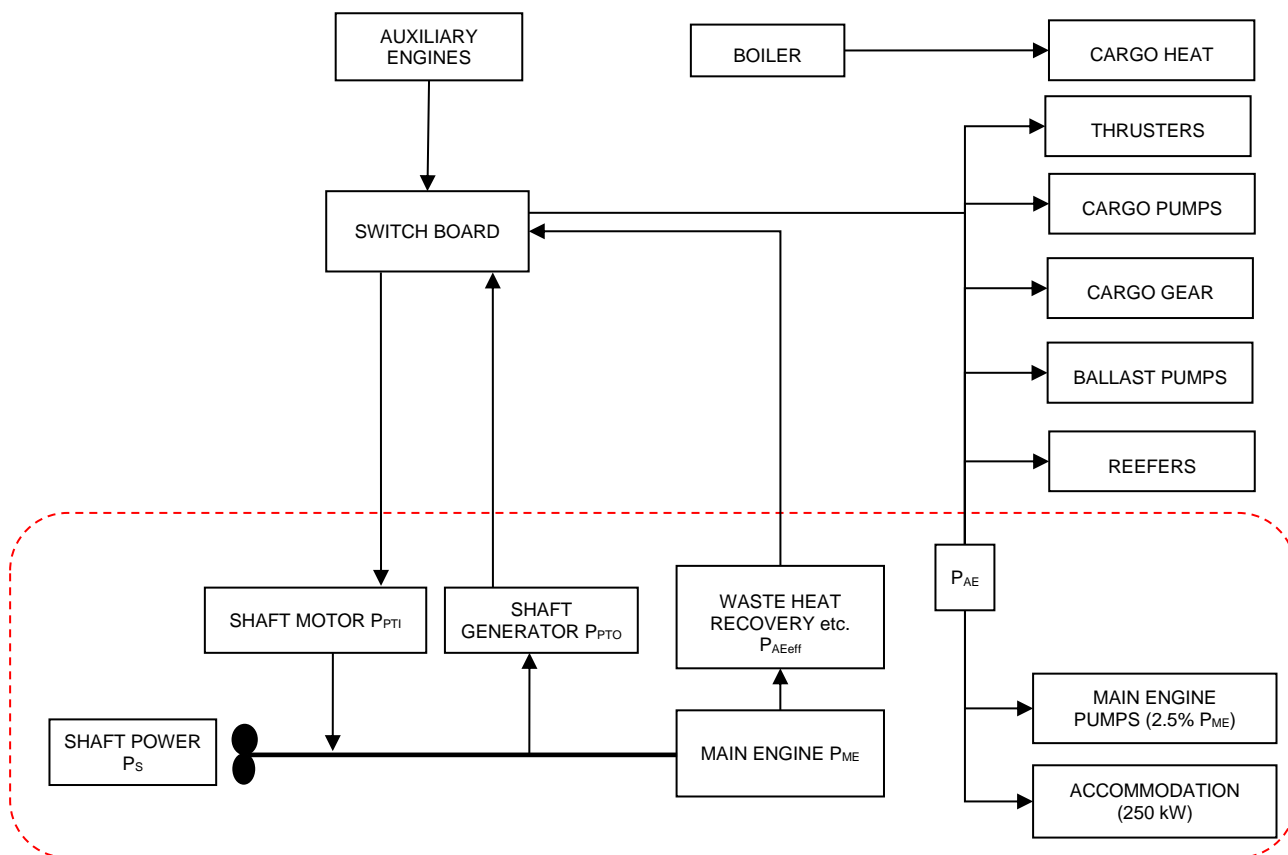
Volumetric displacement, ∇ , in cubic metres (m^3), is the volume of the moulded displacement of the ship, excluding appendages, in a ship with a metal shell, and is the volume of displacement to the outer surface of the hull in a ship with a shell of any other material, both taken at the summer load line draught, d_s , as stated in the approved stability booklet/loading manual.

2.2.18 g ; Gravitational acceleration

g is the gravitational acceleration, 9.81m/s^2 .

APPENDIX 1

A GENERIC AND SIMPLIFIED MARINE POWER PLANT



Note 1: Mechanical recovered waste energy directly coupled to shafts need not be measured, since the effect of the technology is directly reflected in the V_{ref} .

Note 2: In case of combined PTI/PTO, the normal operational mode at sea will determine which of these to be used in the calculation.

APPENDIX 2

GUIDELINES FOR THE DEVELOPMENT OF ELECTRIC POWER TABLES FOR EEDI (EPT-EEDI)

1 Introduction

This appendix contains a guideline for the document "Electric power table for EEDI" which is similar to the actual shipyards' load balance document, utilizing well defined criteria, providing standard format, clear loads definition and grouping, standard load factors, etc. A number of new definitions (in particular the "groups") are introduced, giving an apparent greater complexity to the calculation process. However, this intermediate step to the final calculation of P_{AE} stimulates all the parties to a deep investigation through the global figure of the auxiliary load, allowing comparisons between different ships and technologies and eventually identifying potential efficiencies improvements.

2 Auxiliary load power definition

P_{AE} is to be calculated as indicated in paragraph 2.2.5.6 of the Guidelines, together with the following additional three conditions:

- .1 non-emergency situations (e.g. "no fire", "no flood", "no blackout", "no partial blackout");
- .2 evaluation time frame of 24 hours (to account loads with intermittent use); and
- .3 ship fully loaded with passengers and/or cargo and crew.

3 Definition of the data to be included in the electric power table for EEDI

The electric power table for EEDI calculation should contain the following data elements, as appropriate:

- .1 Load's group;
- .2 Load's description;
- .3 Load's identification tag;
- .4 Load's electric circuit Identification;
- .5 Load's mechanical rated power " P_m " (kW);
- .6 Load's electric motor rated output power (kW);
- .7 Load's electric motor efficiency " e " (/);
- .8 Load's Rated electric power " P_r " (kW);
- .9 Service factor of load " k_l " (/);
- .10 Service factor of duty " k_d " (/);
- .11 Service factor of time " k_t " (/);
- .12 Service total factor of use " k_u " (/), where $k_u = k_l \cdot k_d \cdot k_t$;
- .13 Load's necessary power " P_{load} " (kW), where $P_{load} = P_r \cdot k_u$;
- .14 Notes;
- .15 Group's necessary power (kW); and
- .16 Auxiliaries load's power P_{AE} (kW).

4 Data to be included in the electric power table for EEDI

Load groups

4.1 The loads are divided into defined groups, allowing a proper breakdown of the auxiliaries. This eases the verification process and makes it possible to identify those areas where load reductions might be possible. The groups are listed below:

- .1 A – Hull, deck, navigation and safety services;
- .2 B – Propulsion service auxiliaries;
- .3 C – Auxiliary engine and main engine services;
- .4 D – Ship's general services;
- .5 E – Ventilation for engine-rooms and auxiliaries room;
- .6 F – Air conditioning services;
- .7 G – Galleys, refrigeration and laundries services;
- .8 H – Accommodation services;
- .9 I – Lighting and socket services;
- .10 L – Entertainment services;
- .11 N – Cargo loads; and
- .12 M – Miscellaneous.

All the ship's loads should be delineated in the document, excluding only P_{AEff} , the shaft motors and shaft motors chain (while the propulsion services auxiliaries are partially included below in paragraph 4.1.2 B). Some loads (i.e. thrusters, cargo pumps, cargo gear, ballast pumps, maintaining cargo, reefers and cargo hold fans) still are included in the group for sake of transparency, however their service factor is zero in order to comply with paragraph 2.2.5.6 of the Guidelines (see rows 4 and 5 of the electric power table contained in this appendix), therefore making it easier to verify that all the loads have been considered in the document and there are no loads left out of the measurement.

4.1.1 A – Hull, deck, navigation and safety services

- .1 loads included in the hull services typically are: ICCP systems, mooring equipment, various doors, ballasting systems, bilge systems, stabilizing equipment, etc. Ballasting systems are indicated with service factor equal to zero to comply with paragraph 2.5.6 of the Guidelines (see row 5 of the electric power table contained in this appendix);
- .2 loads included in the deck services typically are: deck and balcony washing systems, rescue systems, cranes, etc.;
- .3 loads included in the navigation services typically are: navigation systems, navigation's external and internal communication systems, steering systems, etc.; and
- .4 loads included in the safety services typically are: active and passive fire systems, emergency shutdown systems, public address systems, etc.

4.1.2 B – Propulsion service auxiliaries

This group typically includes: propulsion secondary cooling systems such as LT cooling pumps dedicated to shaft motors, LT cooling pumps dedicated to propulsion converters, propulsion UPSs, etc. Propulsion service loads do not include shaft motors ($PTI(i)$) and the auxiliaries

which are part of them (shaft motor own cooling fans and pump, etc.) and the shaft motor chain losses and auxiliaries which are part of them (i.e. shaft motor converters including relevant auxiliaries such as converter own cooling fans and pumps, shaft motor transformers including relevant auxiliaries losses such as propulsion transformer own cooling fans and pumps, shaft motor harmonic filter including relevant auxiliaries losses, shaft motor excitation system including the relevant auxiliaries consumed power, etc.). Propulsion service auxiliaries include manoeuvring propulsion equipment such as manoeuvring thrusters and their auxiliaries whose service factor is to be set to zero.

4.1.3 C – Auxiliary engine and main engine services

This group includes: cooling systems, i.e. pumps and fans for cooling circuits dedicated to alternators or propulsion shaft engines (seawater, technical water dedicated pumps, etc.), lubricating and fuel systems feeding, transfer, treatment and storage, ventilation system for combustion air supply, etc.

4.1.4 D – Ship's general services

This group includes loads which provide general services which can be shared between shaft motor, auxiliary engines and main engine and accommodation support systems. Loads typically included in this group are: cooling systems, i.e. pumping seawater, technical water main circuits, compressed air systems, fresh water generators, automation systems, etc.

4.1.5 E – Ventilation for engine-rooms and auxiliaries room

This group includes all fans providing ventilation for engine-rooms and auxiliary rooms that typically are: engine-rooms cooling supply-exhaust fans, auxiliary rooms supply and exhaust fans. All the fans serving accommodation areas or supplying combustion air are not included in this group. This group does not include cargo hold fans and garage supply and exhaust fans.

4.1.6 F – Air conditioning services

All loads that make up the air conditioning service that typically are: air conditioning chillers, air conditioning cooling and heating fluids transfer and treatment, air conditioning's air handling units ventilation, air conditioning re-heating systems with associated pumping, etc. The air conditioning chillers service factor of load, service factor of time and service factor of duty are to be set as 1 ($kl=1$, $kt=1$ and $kd=1$) in order to avoid the detailed validation of the heat load dissipation document (i.e. the chiller's electric motor rated power is to be used). However, kd is to represent the use of spare chillers (e.g. four chillers are installed and one out four is spare then $kd=0$ for the spare chiller and $kd=1$ for the remaining three chillers), but only when the number of spare chillers is clearly demonstrated via the heat load dissipation document.

4.1.7 G – Galleys, refrigeration and laundries services

All loads related to the galleys, pantries refrigeration and laundry services that typically are: galleys various machines, cooking appliances, galleys' cleaning machines, galleys auxiliaries, refrigerated room systems including refrigeration compressors with auxiliaries, air coolers, etc.

4.1.8 H – Accommodation services

All loads related to the accommodation services of passengers and crew that typically are: crew and passengers' transportation systems, i.e. lifts, escalators, etc. environmental services, i.e. black and grey water collecting, transfer, treatment, storage, discharge, waste systems including collecting, transfer, treatment, storage, etc. accommodation fluids transfers, i.e. sanitary hot and cold water pumping, etc., treatment units, pools systems, saunas, gym equipment, etc.

4.1.9 I – Lighting and socket services

All loads related to the lighting, entertainment and socket services. As the quantity of lighting circuits and sockets within the ship may be significantly high, it is not practically feasible to list all the lighting circuits and points in the EPT for EEDI. Therefore circuits should be grouped into subgroups aimed to identify possible improvements of efficient use of power. The subgroups are:

- .1 Lighting for 1) cabins, 2) corridors, 3) technical rooms/stairs, 4) public spaces/stairs, 5) engine-rooms and auxiliaries' room, 6) external areas, 7) garages and 8) cargo spaces. All should be divided by main vertical zones; and
- .2 Power sockets for 1) cabins, 2) corridors, 3) technical rooms/stairs, 4) public spaces/stairs, 5) engine-rooms and auxiliaries' room, 6) garages and 7) cargo spaces. All should be divided by main vertical zones.

The calculation criteria for complex groups (e.g. cabin lighting and power sockets) subgroups are to be included via an explanatory note, indicating the load composition (e.g. lights of typical cabins, TV, hair dryer, fridge, etc., typical cabins).

4.1.10 L – Entertainment services

This group includes all loads related to entertainment services, typically: public spaces audio and video equipment, theatre stage equipment, IT systems for offices, video games, etc.

4.1.11 N – Cargo loads

This group will contain all cargo loads such as cargo pumps, cargo gear, maintaining cargo, cargo reefers loads, cargo hold fans and garage fans for sake of transparency. However, the service factor of this group is to be set to zero.

4.1.12 M – Miscellaneous

This group will contain all loads which have not been associated to the above-mentioned groups but still are contributing to the overall load calculation of the normal maximum sea load.

Loads description

4.2 This identifies the loads (for example "seawater pump").

Loads identification tag

4.3 This tag identifies the loads according to the shipyard's standards tagging system. For example, the "PTI1 fresh water pump" identification tag is "SYYIA/C" for an example ship and shipyard. This data provides a unique identifier for each load.

Loads electric circuit Identification

4.4 This is the tag of the electric circuit supplying the load. Such information allows the data validation process.

Loads mechanical rated power " P_m "

4.5 This data is to be indicated in the document only when the electric load is made by an electric motor driving a mechanical load (for example a fan, a pump, etc.). This is the rated power of the mechanical device driven by an electric motor.

Loads electric motor rated output power (kW)

4.6 The output power of the electric motor as per maker's name plate or technical specification. This data does not take part of the calculation but is useful to highlight potential over rating of the combination motor-mechanical load.

Loads electric motor efficiency " e " (/)

4.7 This data is to be entered in the document only when the electric load is made by an electric motor driving a mechanical load.

Loads rated electric power " P_r " (kW)

4.8 Typically the maximum electric power absorbed at the load electric terminals at which the load has been designed for its service, as indicated on the maker's name plate and/or maker's technical specification. When the electric load is made by an electric motor driving a mechanical load the load's rated electric power is: $P_r = P_m / e$ (kW).

Service factor of load " kl " (/)

4.9 Provides the reduction from the loads rated electric power to loads necessary electric power that is to be made when the load absorb less power than its rated power. For example, in case of electric motor driving a mechanical load, a fan could be designed with some power margin, leading to the fact that the fan rated mechanical power exceeds the power requested by the duct system it serves. Another example is when a pump rated power exceed the power needed for pumping in its delivery fluid circuit. Another example in case of electric self-regulating semi-conductors electric heating system is oversized and the rated power exceeds the power absorbed, according a factor kl .

Service factor of duty " kd " (/)

4.10 Factor of duty is to be used when a function is provided by more than one load. As all loads are to be included in the EPT for EEDI, this factor provides a correct summation of the loads. For example when two pumps serve the same circuit and they run in duty/stand-by their Kd factor will be $\frac{1}{2}$ and $\frac{1}{2}$. When three compressors serves the same circuit and one runs in duty and two in stand-by, then kd is $\frac{1}{3}$, $\frac{1}{3}$ and $\frac{1}{3}$.

Service factor of time " kt " (/)

4.11 A factor of time based on the shipyard's evaluation about the load duty along 24 hours of ship's navigation as defined at paragraph 3. For example the Entertainment loads operate at their power for a limited period of time, 4 hours out 24 hours; as a consequence $kt = 4/24$. For example, the seawater cooling pumps operate at their power all the time during the navigation at V_{ref} . As a consequence $kt = 1$.

Service total factor of use "ku" (/)

4.12 The total factor of use that takes into consideration all the service factors: $ku=kl \cdot kd \cdot kt$.

Loads necessary power "Pload" (kW)

4.13 The individual user contribution to the auxiliary load power is $Pload=Pr \cdot ku$.

Notes

4.14 A note, as free text, could be included in the document to provide explanations to the verifier.

Groups necessary power (kW)

4.15 The summation of the "Loads necessary power" from group A to N. This is an intermediate step which is not strictly necessary for the calculation of *PAE*. However, it is useful to allow a quantitative analysis of the *PAE*, providing a standard breakdown for analysis and potential improvements of energy saving.

Auxiliaries load's power PAE (kW)

4.16 Auxiliaries load's power *PAE* is the summation of the "Load's necessary power" of all the loads divided by the average efficiency of the generator(s) weighted by power.

$$PAE = \sum Pload(i) / (\text{average efficiency of the generator(s) weighted by power})$$

Layout and organization of the data indicated in the electric power table for EEDI

5 The document "Electric power table for EEDI" is to include general information (i.e. ship's name, project name, document references, etc.) and a table with:

- .1 one row containing column titles;
- .2 one Column for table row ID;
- .3 one Column for the groups identification ("A", "B", etc.) as indicated in paragraphs 4.1.1 to 4.1.12 of this appendix;
- .4 one Column for the group descriptions as indicated in paragraphs 4.1.1 to 4.1.12 of this appendix;
- .5 one column each for items in paragraphs 4.2 to 4.14 of this appendix (e.g. "load tag", etc.);
- .6 one row dedicated to each individual load;
- .7 the summation results (i.e. summation of powers) including data from paragraphs 4.15 to 4.16 of this appendix; and
- .8 explanatory notes.

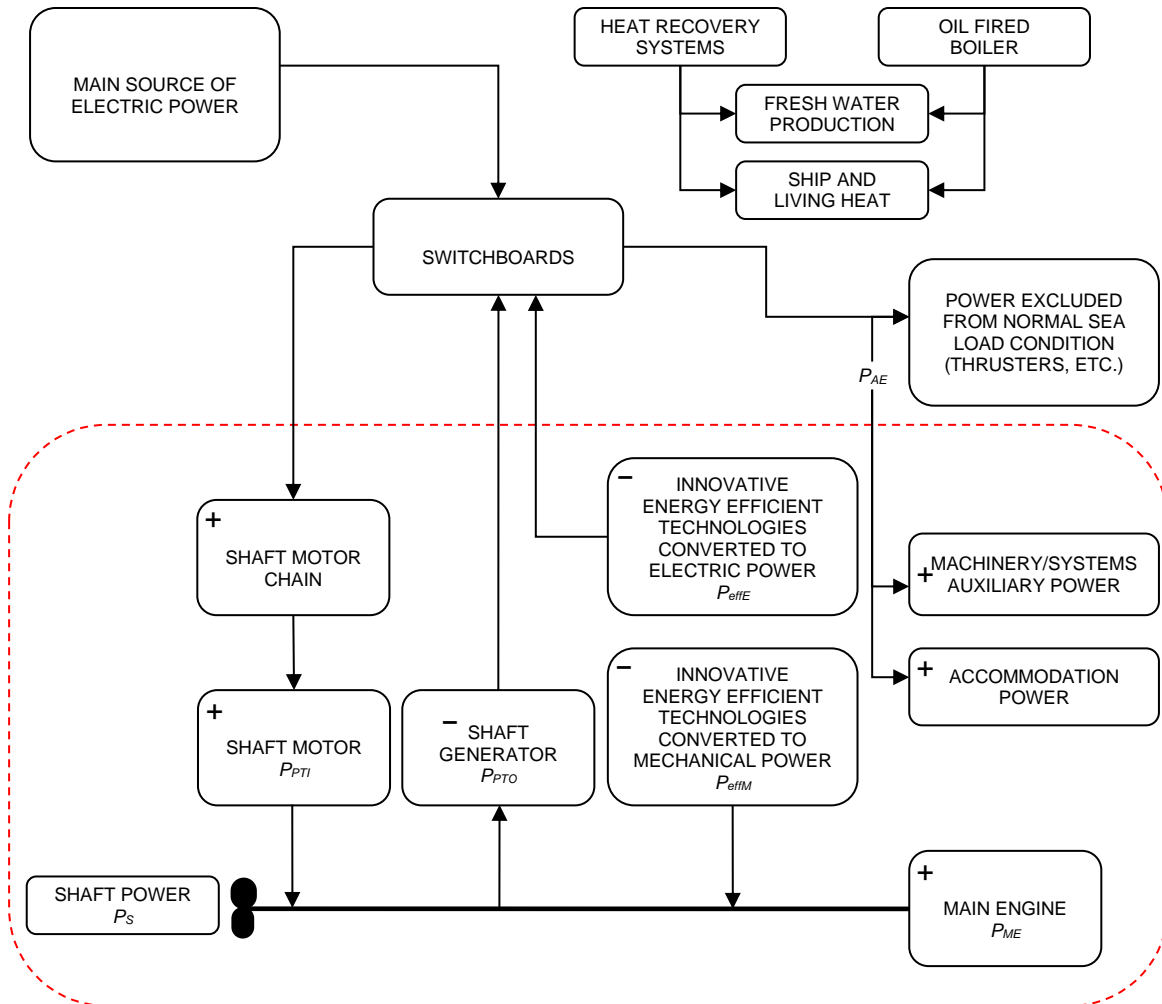
An example of an electric power table for EEDI for a cruise postal ship which transports passengers and has a car garage and reefer holds for fish trade transportation is indicated below. The data indicated and the type of ship is for reference only.

ELECTRIC POWER TABLE FOR EEDI		HULL "EXAMPLE"		PROJECT "EXAMPLE"									(NMSL=Normal Maximum Sea Load)	
id	Load group	Load description	Load identification tag	Load electric circuit identification	Load mechanical rated power "Pm" [kW]	Load electric motor rated output power [kW]	Load electric motor efficiency "e" [%]	Load Rated electric power "Pr" [kW]	service factor of load "kl" [%]	service factor of duty "kd" [%]	service factor of time "kt" [%]	service total factor of use "ku" [%]	Load necessary power "Pload" [kW]	Note
1	A	Hull cathodic protection Fwd	xxx	yyy	n.a.	n.a.	n.a.	5.2	1	1	1*	1	5.2	*in use 24hours/day
2	A	Hull cathodic protection mid	xxx	yyy	n.a.	n.a.	n.a.	7.0	1	1	1*	1	7	*in use 24hours/day
3	A	Hull cathodic protection aft	xxx	yyy	n.a.	n.a.	n.a.	4.8	1	1	1*	1	4.8	*in use 24hours/day
4	A	Ballast pump 3	xxx	yyy	30	36	0.92	32.6	0.9	0.5	1	0*	0	*not in use at NMSL see para 2.5.6 of Circ.681
5	A	Fwd Stb mooring winch motor n.1	xxx	yyy	90	150	0.92	97.8	0.8	1	0*	0*	0	*not in use at NMSL see para 2.5.6 of Circ.681
6	A	WTDs system main control panel	xxx	yyy	n.a.	n.a.	n.a.	0.5	1	1	1*	1	0.5	*in use 24hours/day
7	A	WTD 1, deck D frame 150	xxx	yyy	1.2	3	0.91	1.3	0.7	1	0.104*	0.0728	0.096	*180 secs to open/close x 100 opening a day
8	A	WTD 5, deck D frame 210	xxx	yyy	1.2	3	0.91	1.3	0.7	1	0.156*	0.1092	0.14	*180 secs to open/close x 150 opening a day
9	A	Stabilisers control unit	xxx	yyy	n.a.	n.a.	n.a.	0.7	1	1	1*	1	0.7	*in use 24hours/day
10	A	Stabilisers Hydraulic pack power pump 1	xxx	yyy	80	90	0.9	88.9	0.9	1	0*	0	0	*NMSL=> calm sea=> stabiliser not in use
11	A	S-band Radar 1 controller	xxx	yyy	n.a.	n.a.	n.a.	0.4	1	1	1*	1	0.4	*in use 24hours/day
12	A	S-band Radar 1 motor	xxx	yyy	0.8	1	0.92	0.9	1	1	1*	1	0.9	*in use 24hours/day
13	A	Fire detection system bridge main unit	xxx	yyy	n.a.	n.a.	n.a.	1.5	1	1	1*	1	1.5	*in use 24hours/day
14	A	Fire detection system ECR unit	xxx	yyy	n.a.	n.a.	n.a.	0.9	1	1	1*	1	0.9	*in use 24hours/day
15	A	High pressure water fog control unit	xxx	yyy	n.a.	n.a.	n.a.	1.2	1	1	1*	1	1.2	*in use 24hours/day
16	A	High pressure water fog engines rooms pump 1a	xxx	yyy	25	30	0.93	26.9	0.9	0.5	0*	0	0	*NMSL=> not emergency => Load not in use
17	A	High pressure water fog engines rooms pump 1b	xxx	yyy	25	30	0.93	26.9	0.9	0.5	0*	0	0	* not emergency situations
18	B	PTI port fresh water pump 1	xxx	yyy	30	36	0.92	32.6	0.9	0.5*	1	0.45	14.7	* pump1,2 one is duty and one is stand-by
19	B	PTI port fresh water pump 2	xxx	yyy	30	36	0.92	32.6	0.9	0.5*	1	0.45	14.7	* pump1,2 one is duty and one is stand-by
20	B	Thrusters control system	xxx	yyy	n.a.	n.a.	n.a.	0.5	1	1	1*	1	0.5	*in use 24hours/day (even if thruster motor isn't)
21	B	Bow thruster 1	xxx	yyy	3000	3000	0.96	3125.0	1	1	0*	0	0	*NMSL=>thrusters motor are not in use
22	B	PEM port cooling fan 1	xxx	yyy	20	25	0.93	21.5	0.9	1	n.a.	n.a	n.a.*	*this load is included in the propulsion chain data
23	C	HT circulation pump 1 DG 3	xxx	yyy	8	10	0.92	8.7	0.9	0.5*	1	0.45	3.9	* pump1,2 one is duty and one is stand-by
24	C	HT circulation pump 2 DG 3	xxx	yyy	8	10	0.92	8.7	0.9	0.5*	1	0.45	3.9	* pump1,2 one is duty and one is stand-by
25	C	DG3 combustion air fan	xxx	yyy	28	35	0.92	30.4	0.9	1	1*	0.9	27.4	*in use 24hours/day
26	C	DG3 exhaust gas boiler circulation pump	xxx	yyy	6	8	0.93	6.5	0.8	1	1*	0.8	5.2	*in use 24hours/day
27	C	Alternator 3 external cooling fan	xxx	yyy	3	5	0.93	3.2	0.8	1	1*	0.8	2.75	*in use 24hours/day
28	C	fuel feed fwd booster pump a	xxx	yyy	7	9	0.92	7.6	0.9	0.5*	1	0.45	3.4	* pump1,2 one is duty and one is stand-by
29	C	fuel feed fwd booster pump b	xxx	yyy	7	9	0.92	7.6	0.9	0.5*	1	0.45	3.4	* pump1,2 one is duty and one is stand-by
30	D	Fwd main LT cooling pump 1	xxx	yyy	120	150	0.95	126.3	0.9	0.5*	1	0.45	56.8	* pump1,2 one is duty and one is stand-by
31	D	Fwd main LT cooling pump 2	xxx	yyy	120	150	0.95	126.3	0.9	0.5*	1	0.45	56.8	* pump1,2 one is duty and one is stand-by
32	E	FWD engine room supply fan 1	xxx	yyy	87.8	110	0.93	94.4	0.95	1	1*	0.95	89.7	*in use 24hours/day
33	E	FWD engine room exhaust fan 1	xxx	yyy	75	86	0.93	80.6	0.96	1	1*	0.96	77.4	*in use 24hours/day
34	E	purifier room supply fan 1	xxx	yyy	60	70	0.93	64.5	0.96	0.5	1*	0.48	31.0	*in use 24hours/day
35	E	purifier room supply fan 2	xxx	yyy	60	70	0.93	64.5	0.96	0.5	1*	0.48	31.0	*in use 24hours/day
36	F	HVAC chiller a	xxx	yyy	1450	1600	0.95	1526.3	1	2/3*	1	0.66	1007.4	*1 Chiller is spare; see heat load dissipation doc.
37	F	HVAC chiller b	xxx	yyy	1450	1600	0.95	1526.3	1	2/3*	1	0.66	1007.4	*1 Chiller is spare; see heat load dissipation doc.
38	F	HVAC chiller C	xxx	yyy	1450	1600	0.95	1526.3	1	2/3*	1	0.66	1007.4	*1 Chiller is spare; see heat load dissipation doc.
39	F	A.H.U. Ac station 5.4 supply fan	xxx	yyy	50	60	0.93	53.8	0.9	1	1*	0.9	48.4	*in use 24hours/day
40	F	A.H.U. Ac station 5.4 exhaust fan	xxx	yyy	45	55	0.93	48.4	0.9	1	1*	0.9	43.5	*in use 24hours/day
41	F	Chilled water pump a	xxx	yyy	80	90	0.93	86.0	0.88	0.5*	1	0.44	37.8	* pump1,2 one is duty and one is stand-by
42	F	Chilled water pump b	xxx	yyy	80	90	0.93	86.0	0.88	0.5*	1	0.44	37.8	* pump1,2 one is duty and one is stand-by
43	G	Italian's espresso coffee machine	xxx	yyy	n.a.	n.a.	n.a.	7.0	0.9	1	0.2*	0.18	1.3	*in use 4.8hours/day
44	G	deep freezer machine	xxx	yyy	n.a.	n.a.	n.a.	20.0	0.8	1	0.16*	0.128	3.2	*in use 4hours/day
45	G	washing machine 1	xxx	yyy	n.a.	n.a.	n.a.	8.0	0.8	1	0.33*	0.264	3.2	*in use 8hours/day
46	H	lift pax mid 4	xxx	yyy	30	40	0.93	32.3	0.5	1	0.175*	0.0875	0.9	*in use 4hours/day
47	H	vacuum collecting system 4 pump a	xxx	yyy	10	13	0.92	10.9	0.9	1	1*	0.9	8.7	*in use 24hours/day
48	H	sewage treatmet system 1 pump 1	xxx	yyy	15	17	0.93	16.1	0.9	1	1*	0.9	8.7	*in use 24hours/day
49	H	Gym running machine	xxx	yyy	n.a.	n.a.	n.a.	2.5	1	1	0.3*	0.3	0.8	*in use 7.2hours/day
50	I	Cabin's lighting MVZ3	n.a.	n.a.	n.a.	n.a.	n.a.	80*	1	1	1	1	80.0	* see explanatory note
51	I	corridors lighting MVZ3	n.a.	n.a.	n.a.	n.a.	n.a.	10*	1	1	1	1	10.0	* see explanatory note
52	I	Cabin's sockets MVZ3	n.a.	n.a.	n.a.	n.a.	n.a.	5*	1	1	1	1	5.0	* see explanatory note
53	L	Main Theatre audio booster amplifier	xxx	yyy	n.a.	n.a.	n.a.	15.0	1	1	0.3*	0.3	4.5	*in use 7.2hours/day
54	L	Video wall atrium	xxx	yyy	n.a.	n.a.	n.a.	2.0	1	1	0.3*	0.3	0.6	*in use 7.2hours/day
55	M	Car Garage supply fan1	xxx	yyy	28	35	0.92	30.4	0.9	1	1*	0*	0	*not in use at NMSL see para 2.5.6 of Circ.681
56	M	Fish transportation reefeel hold n.2	xxx	yyy	25	30	0.93	26.9	0.9	0.5	0*	0*	0	*not in use at NMSL see para 2.5.6 of Circ.681
57	N	Sliding glass roof	xxx	yyy	30	40	0.93	32.3	0.9	1	0.3*	0.27	0.2	*in use 7.2hours/day
													ΣPload(i)=	3764

PAE =3764/(weighted average efficiency of generator(s)) [kW] Group's necessary power (group A=22.9kW, B=29.8kW,C=49.9kW, D=113.7kW, E=229kW, F=3189kW, G=7.6kW, H=19kW, I=95kW, L=5.1kW, M=0kW, N=0.22kW)

APPENDIX 3

**A GENERIC AND SIMPLIFIED MARINE POWER PLANT
FOR A CRUISE PASSENGER SHIPS HAVING NON-CONVENTIONAL PROPULSION**

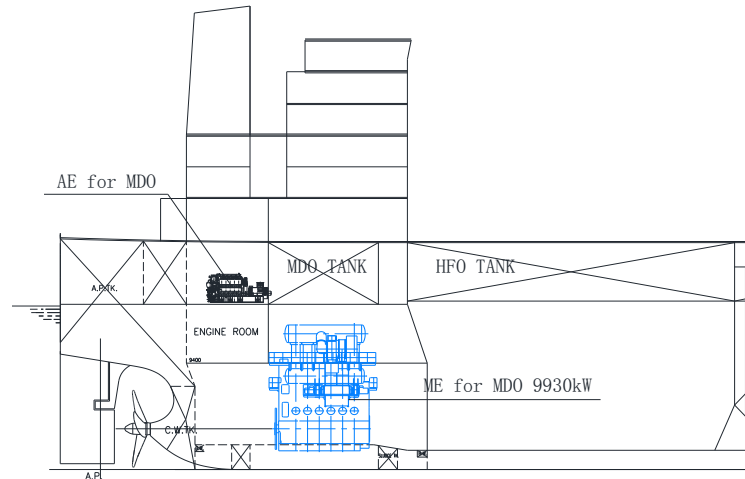


Note: Symbols for plus (+) and minus (-) indicate CO₂ contribution to EEDI formula.

APPENDIX 4

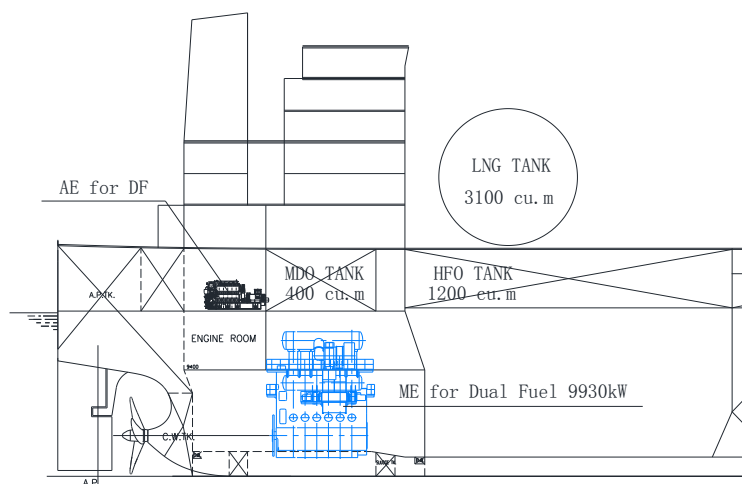
EEDI CALCULATION EXAMPLES FOR USE OF DUAL FUEL ENGINES

Case 1: Standard Kamsarmax ship, one main engine (MDO), standard auxiliary engines (MDO), no shaft generator:



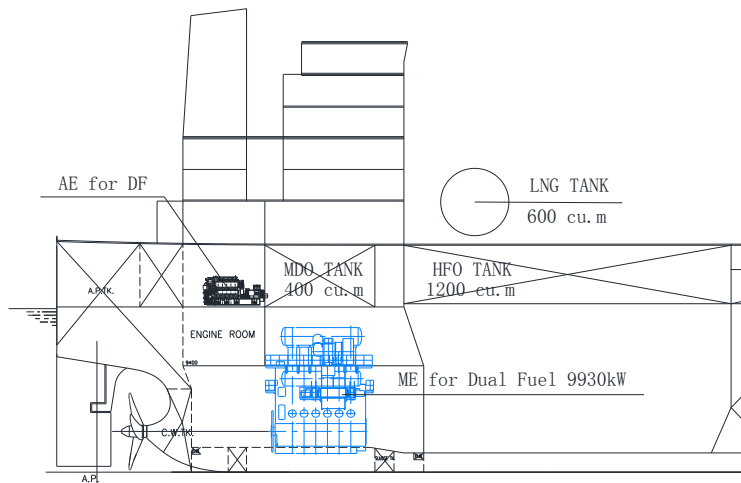
S/N	Parameter	Formula or Source	Unit	Value
1	MCR _{ME}	MCR rating of main engine	kW	9930
2	Capacity	Deadweight of the ship at summer load draft	DWT	81200
3	V _{ref}	Ships speed as defined in EEDI regulation	kn	14
4	P _{ME}	0.75 x MCR _{ME}	kW	7447.5
5	P _{AE}	0.05 x MCR _{ME}	kW	496.5
6	C _{FME}	C _F factor of Main engine using MDO	-	3.206
7	C _{F_{AE}}	C _F factor of Auxiliary engine using MDO	-	3.206
8	SFC _{ME}	Specific fuel consumption of at P _{ME}	g/kWh	165
9	SFC _{AE}	Specific fuel consumption of at P _{AE}	g/kWh	210
10	EEDI	$\frac{((P_{ME} \times C_{F_{ME}} \times SFC_{ME}) + (P_{AE} \times C_{F_{AE}} \times SFC_{AE}))}{(V_{ref} \times Capacity)}$	gCO ₂ /tnm	3.76

Case 2: LNG is regarded as the "primary fuel" if dual-fuel main engine and dual-fuel auxiliary engine (LNG, pilot fuel MDO; no shaft generator) are equipped with bigger LNG tanks:



S/N	Parameter	Formula or Source	Unit	Value
1	MCR_{ME}	MCR rating of main engine	kW	9930
2	Capacity	Deadweight of the ship at summer load draft	DWT	81200
3	V_{ref}	Ships speed as defined in EEDI regulation	kn	14
4	P_{ME}	$0.75 \times MCR_{ME}$	kW	7447.5
5	P_{AE}	$0.05 \times MCR_{ME}$	kW	496.5
6	$CF_{Pilotfuel}$	C_F factor of pilot fuel for dual fuel ME using MDO	-	3.206
7	$CF_{AE Pilotfuel}$	C_F factor of pilot fuel for Auxiliary engine using MDO	-	3.206
8	CF_{LNG}	C_F factor of dual fuel engine using LNG	-	2.75
9	$SFC_{ME Pilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel ME at P_{ME}	g/kWh	6
10	$SFC_{AE Pilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel AE at P_{AE}	g/kWh	7
11	$SFC_{ME LNG}$	Specific fuel consumption of ME using LNG at P_{ME}	g/kWh	136
12	$SFC_{AE LNG}$	Specific fuel consumption of AE using LNG at P_{AE}	g/kWh	160
13	V_{LNG}	LNG tank capacity on board	m^3	3100
14	V_{HFO}	Heavy fuel oil tank capacity on board	m^3	1200
15	V_{MDO}	Marine diesel oil tank capacity on board	m^3	400
16	ρ_{LNG}	Density of LNG	kg/m^3	450
17	ρ_{HFO}	Density of heavy fuel oil	kg/m^3	991
18	ρ_{MDO}	Density of Marine diesel oil	kg/m^3	900
19	LCV_{LNG}	Low calorific value of LNG	kJ/kg	48000
20	LCV_{HFO}	Low calorific value of heavy fuel oil	kJ/kg	40200
21	LCV_{MDO}	Low calorific value of marine diesel oil	kJ/kg	42700
22	K_{LNG}	Filling rate of LNG tank	-	0.95
23	K_{HFO}	Filling rate of heavy fuel tank	-	0.98
24	K_{MDO}	Filling rate of marine diesel tank	-	0.98
25	f_{DFgas}	$\frac{P_{ME} + P_{AE}}{P_{ME} + P_{AE}} \times \frac{V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}{V_{HFO} \times \rho_{HFO} \times LCV_{HFO} \times K_{HFO} + V_{MDO} \times \rho_{MDO} \times LCV_{MDO} \times K_{MDO} + V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}$	-	0.5068
26	EEDI	$\frac{(P_{ME} \times (C_F Pilotfuel \times SFC_{ME Pilotfuel} + C_F LNG \times SFC_{ME LNG}) + P_{AE} \times (C_F Pilotfuel \times SFC_{AE Pilotfuel} + C_F LNG \times SFC_{AE LNG}))}{(V_{ref} \times Capacity)}$	gCO_2/tnm	2.78

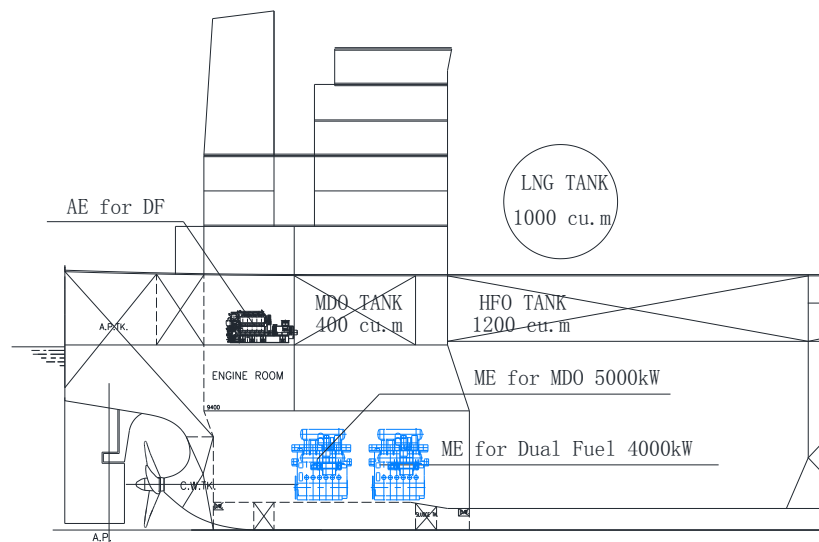
Case 3: LNG is not regarded as the "primary fuel" if dual-fuel main engine and dual-fuel auxiliary engine (LNG, pilot fuel MDO; no shaft generator) are equipped with smaller LNG tanks:



S/N	Parameter	Formula or Source	Unit	Value
1	MCR_{ME}	MCR rating of main engine	kW	9930
2	Capacity	Deadweight of the ship at summer load draft	DWT	81200
3	V_{ref}	Ships speed as defined in EEDI regulation	kn	14
4	P_{ME}	$0.75 \times MCR_{ME}$	kW	7447.5
5	P_{AE}	$0.05 \times MCR_{ME}$	kW	496.5
6	$C_{FPilotfuel}$	C_F factor of pilot fuel for dual fuel ME using MDO	-	3.206
7	$C_{FAE Pilotfuel}$	C_F factor of pilot fuel for Auxiliary engine using MDO	-	3.206
8	C_{FLNG}	C_F factor of dual fuel engine using LNG	-	2.75
9	C_{FMDO}	C_F factor of dual fuel ME/AE engine using MDO	-	3.206
10	$SFC_{MEPilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel ME at P_{ME}	g/kWh	6
11	$SFC_{AE Pilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel AE at P_{AE}	g/kWh	7
12	$SFC_{ME LNG}$	Specific fuel consumption of ME using LNG at P_{ME}	g/kWh	136
13	$SFC_{AE LNG}$	Specific fuel consumption of AE using LNG at P_{AE}	g/kWh	160
14	$SFC_{ME MDO}$	Specific fuel consumption of dual fuel ME using MDO at P_{ME}	g/kWh	165
15	$SFC_{AE MDO}$	Specific fuel consumption of dual fuel AE using MDO at P_{AE}	g/kWh	187
16	V_{LNG}	LNG tank capacity on board	m^3	600
17	V_{HFO}	Heavy fuel oil tank capacity on board	m^3	1800
18	V_{MDO}	Marine diesel oil tank capacity on board	m^3	400
19	ρ_{LNG}	Density of LNG	kg/m^3	450
20	ρ_{HFO}	Density of heavy fuel oil	kg/m^3	991
21	ρ_{MDO}	Density of Marine diesel oil	kg/m^3	900
22	LCV_{LNG}	Low calorific value of LNG	kJ/kg	48000
24	LCV_{HFO}	Low calorific value of heavy fuel oil	kJ/kg	40200
25	LCV_{MDO}	Low calorific value of marine diesel oil	kJ/kg	42700
26	K_{LNG}	Filling rate of LNG tank	-	0.95
27	K_{HFO}	Filling rate of heavy fuel tank	-	0.98

S/N	Parameter	Formula or Source	Unit	Value
28	K_{MDO}	Filling rate of marine diesel tank	-	0.98
29	f_{DFgas}	$\frac{P_{ME} + P_{AE}}{P_{ME} + P_{AE}} \times \frac{V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}{V_{HFO} \times \rho_{HFO} \times LCV_{HFO} \times K_{HFO} + V_{MDO} \times \rho_{MDO} \times LCV_{MDO} \times K_{MDO} + V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}$	-	0.1261
30	$f_{DFliquid}$	$1 - f_{DFgas}$	-	0.8739
31	EEDI	$(P_{ME} \times (f_{DFgas} \times (C_{F Pilotfuel} \times SFC_{ME Pilotfuel} + C_{F LNG} \times SFC_{ME LNG}) + f_{DFliquid} \times C_{FMDO} \times SFC_{ME MDO}) + P_{AE} \times (f_{DFgas} \times (C_{FAE Pilotfuel} \times SFC_{AE Pilotfuel} + C_{F LNG} \times SFC_{AE LNG}) + f_{DFliquid} \times C_{FMDO} \times SFC_{AE MDO})) / (V_{ref} \times Capacity)$	gCO ₂ /tnm	3.61

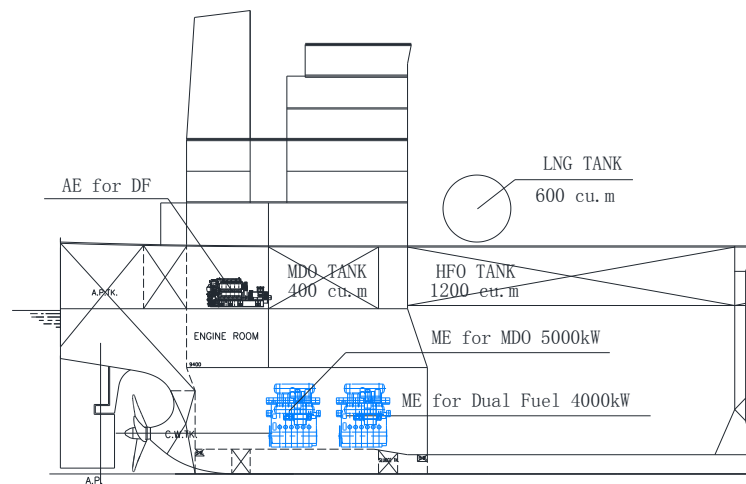
Case 4: One dual-fuel main engine (LNG, pilot fuel MDO) and one main engine (MDO) and dual-fuel auxiliary engine (LNG, pilot fuel MDO, no shaft generator) which LNG could be regarded as "primary fuel" only for the dual-fuel main engine:



S/N	Parameter	Formula or Source	Unit	Value
1	MCR_{MEMDO}	MCR rating of main engine using only MDO	kW	5000
2	MCR_{MELNG}	MCR rating of main engine using dual fuel	kW	4000
3	Capacity	Deadweight of the ship at summer load draft	DWT	81200
4	V_{ref}	Ships speed	kn	14
5	P_{MEMDO}	$0.75 \times MCR_{MEMDO}$	kW	3750
6	P_{MELNG}	$0.75 \times MCR_{MELNG}$	kW	3000
7	P_{AE}	$0.05 \times (MCR_{MEMDO} + MCR_{MELNG})$	kW	450
8	$C_{FPilotfuel}$	C_F factor of pilot fuel for dual fuel ME using MDO	-	3.206
9	$C_{FAE Pilotfuel}$	C_F factor of pilot fuel for Auxiliary engine using MDO	-	3.206
10	C_{FLNG}	C_F factor of dual fuel engine using LNG	-	2.75
11	C_{FMDO}	C_F factor of dual fuel ME/AE engine using MDO	-	3.206
12	$SFC_{MEPilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel ME at P_{ME}	g/kWh	6
13	$SFC_{AE Pilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel AE at P_{AE}	g/kWh	7
14	$SFC_{DF LNG}$	Specific fuel consumption of dual fuel ME using LNG at P_{ME}	g/kWh	158
15	$SFC_{AE LNG}$	Specific fuel consumption of AE using LNG at P_{AE}	g/kWh	160
16	$SFC_{ME MDO}$	Specific fuel consumption of single fuel ME at P_{ME}	g/kWh	180
17	V_{LNG}	LNG tank capacity on board	m ³	1000
18	V_{HFO}	Heavy fuel oil tank capacity on board	m ³	1200

S/N	Parameter	Formula or Source	Unit	Value
19	V_{MDO}	Marine diesel oil tank capacity on board	m^3	400
20	ρ_{LNG}	Density of LNG	kg/m^3	450
21	ρ_{HFO}	Density of heavy fuel oil	kg/m^3	991
22	ρ_{MDO}	Density of Marine diesel oil	kg/m^3	900
23	LCV_{LNG}	Low calorific value of LNG	kJ/kg	48000
24	LCV_{HFO}	Low calorific value of heavy fuel oil	kJ/kg	40200
25	LCV_{MDO}	Low calorific value of marine diesel oil	kJ/kg	42700
26	K_{LNG}	Filling rate of LNG tank	-	0.95
27	K_{HFO}	Filling rate of heavy fuel tank	-	0.98
28	K_{MDO}	Filling rate of marine diesel tank	-	0.98
29	f_{DFgas}	$\frac{P_{MEMDO} + P_{MELNG} + P_{AE}}{P_{MELNG} + P_{AE}} \times \frac{V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}{V_{HFO} \times \rho_{HFO} \times LCV_{HFO} \times K_{HFO} + V_{MDO} \times \rho_{MDO} \times LCV_{MDO} \times K_{MDO} + V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}$	-	0.5195
30	EEDI	$(P_{MELNG} \times (C_{F Pilotfuel} \times SFC_{ME Pilotfuel} + C_{FLNG} \times SFC_{DF LNG}) + P_{MEMDO} \times C_{FMDO} \times SFC_{MEMDO} + P_{AE} \times (C_{FAE Pilotfuel} \times SFC_{AE Pilotfuel} + C_{FLNG} \times SFC_{AE LNG})) / (V_{ref} \times Capacity)$	gCO_2/tnm	3.28

Case 5: One dual-fuel main engine (LNG, pilot fuel MDO) and one main engine (MDO) and dual-fuel auxiliary engine (LNG, pilot fuel MDO, no shaft generator) which LNG could not be regarded as "primary fuel" for the dual- fuel main engine:



S/N	Parameter	Formula or Source	Unit	Value
1	MCR_{MEMDO}	MCR rating of main engine using only MDO	kW	5000
2	MCR_{MELNG}	MCR rating of main engine using dual fuel	kW	4000
3	Capacity	Deadweight of the ship at summer load draft	DWT	81200
4	V_{ref}	Ships speed	kn	14
5	P_{MEMDO}	$0.75 \times MCR_{MEMDO}$	kW	3750
6	P_{MELNG}	$0.75 \times MCR_{MELNG}$	kW	3000
7	P_{AE}	$0.05 \times (MCR_{MEMDO} + MCR_{MELNG})$	kW	450
8	$C_{FPilotfuel}$	C_F factor of pilot fuel for dual fuel ME using MDO	-	3.206
9	$C_{FAE Pilotfuel}$	C_F factor of pilot fuel for Auxiliary engine using MDO	-	3.206
10	C_{FLNG}	C_F factor of dual fuel engine using LNG	-	2.75
11	C_{FMDO}	C_F factor of dual fuel ME/AE engine using MDO	-	2.75
12	$SFC_{MEPilotfuel}$	Specific fuel consumption of pilot fuel for dual fuel ME at P_{ME}	g/kWh	6

S/N	Parameter	Formula or Source	Unit	Value
13	SFC _{AE Pilotfuel}	Specific fuel consumption of pilot fuel for dual fuel AE at P _{AE}	g/kWh	7
14	SFC _{DF LNG}	Specific fuel consumption of dual fuel ME using LNG at P _{ME}	g/kWh	158
15	SFC _{AE LNG}	Specific fuel consumption of AE using LNG at P _{AE}	g/kWh	160
16	SFC _{DF MDO}	Specific fuel consumption of dual fuel ME using MDO at P _{ME}	g/kWh	185
17	SFC _{ME MDO}	Specific fuel consumption of single fuel ME at P _{ME}	g/kWh	180
18	SFC _{AE MDO}	Specific fuel consumption of AE using MDO at P _{AE}	g/kWh	187
19	V _{LNG}	LNG tank capacity on board	m ³	600
20	V _{HFO}	Heavy fuel oil tank capacity on board	m ³	1200
21	V _{MDO}	Marine diesel oil tank capacity on board	m ³	400
22	ρ _{LNG}	Density of LNG	kg/m ³	450
23	ρ _{HFO}	Density of heavy fuel oil	kg/m ³	991
24	ρ _{MDO}	Density of Marine diesel oil	kg/m ³	900
25	LCV _{LNG}	Low calorific value of LNG	kJ/kg	48000
26	LCV _{HFO}	Low calorific value of heavy fuel oil	kJ/kg	40200
27	LCV _{MDO}	Low calorific value of marine diesel oil	kJ/kg	42700
28	K _{LNG}	Filling rate of LNG tank	-	0.95
29	K _{HFO}	Filling rate of heavy fuel tank	-	0.98
30	K _{MDO}	Filling rate of marine diesel tank	-	0.98
31	f _{DFgas}	$\frac{P_{MEMDO} + P_{MELNG} + P_{AE}}{P_{MELNG} + P_{AE}} \times \frac{V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}{V_{HFO} \times \rho_{HFO} \times LCV_{HFO} \times K_{HFO} + V_{MDO} \times \rho_{MDO} \times LCV_{MDO} \times K_{MDO} + V_{LNG} \times \rho_{LNG} \times LCV_{LNG} \times K_{LNG}}$	-	0.3462
32	f _{DFliquid}	1- f _{DFgas}	-	0.6538
33	EEDI	$(P_{MELNG} \times (f_{DFgas} \times (C_{F Pilotfuel} \times SFC_{ME Pilotfuel} + C_{F LNG} \times SFC_{DF LNG}) + f_{DFliquid} \times C_{FMDO} \times SFC_{DF MDO})) + P_{MEMDO} \times C_{FMDO} \times SFC_{ME MDO} + P_{AE} \times (f_{DFgas} \times (C_{FAE Pilotfuel} \times SFC_{AE Pilotfuel} + C_{F LNG} \times SFC_{AE LNG}) + f_{DFliquid} \times C_{FMDO} \times SFC_{AE MDO})) / (V_{ref} \times Capacity)$	gCO ₂ /tnm	3.54

ANNEX 6

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(Electronic Record Books and EEDI regulations for Ice-strengthened ships)

Regulation 2 – Definitions

1 Paragraph 42 is replaced by the following:

"42 *Polar Code* means the International Code for Ships Operating in Polar Waters, consisting of an introduction, parts I-A and II-A and parts I-B and II-B, adopted by resolutions MSC.385(94) and MEPC.264(68), as may be amended, provided that:

- .1 amendments to the environment-related provisions of the introduction and chapter 1 of part II-A of the Polar Code are adopted, brought into force and take effect in accordance with the provisions of article 16 of the present Convention concerning the amendment procedures applicable to an appendix to an annex; and
- .2 amendments to part II-B of the Polar Code are adopted by the Marine Environment Protection Committee in accordance with its Rules of Procedure."

2 A new paragraph 51 is added as follows:

"51 *Electronic Record Book* means a device or system, approved by the Administration, used to electronically record the required entries for discharges, transfers and other operations as required under this Annex in lieu of a hard copy record book.*"

Regulation 12 – Ozone-depleting substances

3 In the second sentence of paragraph 6, the words "recording system" are replaced by "record book*"

Regulation 13 – Nitrogen oxides (NO_x)

4 In paragraph 5.3, the words "or electronic record book*," are inserted after the words "shall be recorded in such log-book",

Regulation 14 – Sulphur oxides (SO_x) and particulate matter

5 In the last sentence of paragraph 6, the words "or electronic record book*," are inserted after the words "shall be recorded in such log-book",

* Refer to the *Guidelines for the use of electronic record books under MARPOL*, adopted by resolution MEPC...(…)."

Regulation 19 – Application

6 In the last sentence of paragraph 3, the words "cargo ships having ice-breaking capability" are replaced by the words "category A ships as defined in the Polar Code".

ANNEX 7

**RESOLUTION MEPC.309(73)
(adopted on 26 October 2018)**

**AMENDMENTS TO THE 2014 GUIDELINES ON SURVEY AND CERTIFICATION
OF THE ENERGY EFFICIENCY DESIGN INDEX (EEDI)
(RESOLUTION MEPC.254(67), AS AMENDED BY RESOLUTION MEPC.261(68))**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that it adopted, by resolution MEPC.203(62), Amendments to the annex of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (inclusion of regulations on energy efficiency for ships in MARPOL Annex VI),

NOTING that the aforementioned amendments to MARPOL Annex VI entered into force on 1 January 2013,

NOTING ALSO that regulation 5 (Surveys) of MARPOL Annex VI, as amended, requires ships to which chapter 4 applies shall also be subject to survey and certification taking into account guidelines developed by the Organization,

NOTING FURTHER that it adopted, by resolution MEPC.214(63), the *2012 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, and, by resolution MEPC.234(65), the amendments thereto,

NOTING FURTHER that it adopted, by resolution MEPC.254(67), the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, and by resolution MEPC.261(68), amendments thereto,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for the smooth and uniform implementation of the regulations,

HAVING CONSIDERED, at its seventy-third session, proposed amendments to the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, as amended,

1 ADOPTS amendments to the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the aforementioned amendments into account when developing and enacting national laws which give force to and implement provisions set forth in regulation 5 of MARPOL Annex VI, as amended;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the attention of shipowners, ship operators shipbuilders, ship designers and any other interested groups;

4 AGREES to keep these Guidelines, as amended, under review, in light of the experience gained with their application.

ANNEX

**AMENDMENTS TO THE 2014 GUIDELINES ON SURVEY AND CERTIFICATION
OF THE ENERGY EFFICIENCY DESIGN INDEX (EEDI)
(RESOLUTION MEPC.254(67), AS AMENDED BY RESOLUTION MEPC.261(68))**

1 Footnote for the title of section 2 is replaced by the following:

"2 DEFINITIONS¹

¹ Other terms used in these guidelines have the same meaning as those defined in the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73))."

2 Paragraph 4.1.1 is replaced by the following:

"4.1.1 The attained EEDI should be calculated in accordance with regulation 20 of MARPOL Annex VI and the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)) (EEDI Calculation Guidelines). Survey and certification of the EEDI should be conducted in two stages: preliminary verification at the design stage and final verification at the sea trial. The basic flow of the survey and certification process is presented in figure 1."

3 Paragraphs 4.2.2.1 and 4.2.2.2 are replaced by the following:

- ".1 deadweight (DWT) or gross tonnage (GT) for passenger and ro-ro passenger ships, the maximum continuous rating (MCR) of the main and auxiliary engines, the ship speed (V_{ref}), as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, type of fuel, the specific fuel consumption (*SFC*) of the main engine at 75% of MCR power, the *SFC* of the auxiliary engines at 50% MCR power, and the electric power table for certain ship types, as necessary, as defined in the EEDI Calculation Guidelines;
- ".2 power curve(s) (kW – knot) estimated at design stage under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, and, in the event that the sea trial is carried out in a condition other than the above condition, also a power curve estimated under the sea trial condition;"

4 Paragraph 4.2.8.2 is replaced by the following:

".2 LNG cargo tank capacity in m³ and BOR as defined in paragraph 2.2.5.6.3 of the EEDI Calculation Guidelines;"

5 Paragraph 4.2.8.5 is replaced by the following:

".5 $SFC_{SteamTurbine}$ for steam turbine, as specified in paragraph 2.2.7 of the EEDI Calculation Guidelines."

6 Paragraph 4.2.5 is replaced by the following:

"4.2.5 For ships to which regulation 21 of MARPOL Annex VI applies, the power curves used for the preliminary verification at the design stage should be based on reliable results of tank tests. A tank test for an individual ship may be omitted based

on technical justifications such as availability of the results of tank tests for ships of the same type. In addition, the omission of tank tests is acceptable for a ship for which sea trials will be carried out under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, upon agreement of the shipowner and shipbuilder and with the approval of the verifier. To ensure the quality of tank tests, the ITTC quality system should be taken into account. Model tank tests should be witnessed by the verifier."

7 Paragraph 4.2.7.4 is replaced by the following:

".4 detailed report on the method and results of the tank test; this should include at least the tank test results at sea trial condition and under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines;"

8 Paragraph 4.3.1 is replaced by the following:

"4.3.1 Sea trial conditions should be set as the conditions specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, if possible."

9 Paragraph 4.3.5 is replaced by the following:

"4.3.5 Sea conditions should be measured in accordance with ITTC Recommended Procedure 7.5-04-01-01.1 Speed and Power Trials 2017 or ISO 15016:2015."

10 Paragraph 4.3.6 is replaced by the following:

"4.3.6 Ship speed should be measured in accordance with ITTC Recommended Procedure 7.5-04-01-01.1 Speed and Power Trials 2017 or ISO 15016:2015, and at more than two points of which range includes the power of the main engine as specified in paragraph 2.2.5 of the EEDI Calculation Guidelines."

11 Paragraph 4.3.8 is replaced by the following:

"4.3.8 The submitter should develop power curves based on the measured ship speed and the measured output of the main engine at sea trial. For the development of the power curves, the submitter should calibrate the measured ship speed, if necessary, by taking into account the effects of wind, current, waves, shallow water, displacement, water temperature and water density in accordance with ITTC Recommended Procedure 7.5-04-01-01.1 Speed and Power Trials 2017 or ISO 15016:2015. Upon agreement with the shipowner, the submitter should submit a report on the speed trials including details of the power curve development to the verifier for verification."

12 Paragraphs 4.3.9.1 and 4.3.9.2 are replaced by the following:

".1 for ships for which sea trial is conducted under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines: the attained EEDI should be recalculated using the measured ship speed at sea trial at the power of the main engine as specified in paragraph 2.2.5 of the EEDI Calculation Guidelines; and

".2 for ships for which sea trial cannot be conducted under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines: if the measured ship speed at the power of the main engine as specified in

paragraph 2.2.5 of the EEDI Calculation Guidelines at the sea trial conditions is different from the expected ship speed on the power curve at the corresponding condition, the shipbuilder should recalculate the attained EEDI by adjusting ship speed under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines by an appropriate correction method that is agreed by the verifier."

13 Paragraph 4.3.13 is replaced by the following:

"4.3.13 The EEDI Technical File should be revised, as necessary, by taking into account the results of sea trials. Such revision should include, as applicable, the adjusted power curve based on the results of sea trials (namely, modified ship speed under the condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines), the finally determined deadweight/gross tonnage, η for LNG carriers having diesel electric propulsion system and *SFC* described in the approved NO_x Technical File, and the recalculated attained EEDI based on these modifications."

14 Section 2 of appendix 2 is replaced by the following:

"These guidelines provide a framework for the uniform application of the EPT-EEDI validation process for ships for which required auxiliary engine power is calculated under paragraph 2.2.5.7 of the EEDI Calculation Guidelines."

15 Paragraph 3.5 of appendix 2 is replaced by the following:

"3.5 P_{AE} herein is defined as per the definition in paragraph 2.2.5.6 of the EEDI Calculation Guidelines."

16 Paragraph 4.1 of appendix 2 is replaced by the following:

"4.1 These guidelines are applicable to ships as stipulated in paragraph 2.2.5.7 of the EEDI Calculation Guidelines."

ANNEX 8

UNIFIED INTERPRETATIONS OF REGULATIONS 2.9, 5.4.5, 22.2, 22.3, 22A.1, 22A.8 AND APPENDIX IX OF MARPOL ANNEX VI

1 Confirmation of compliance for new ships

Regulation 5.4.5 reads as follows:

"5 The Administration shall ensure that for each ship to which regulation 22A applies, the SEEMP complies with regulation 22.2 of this Annex. This shall be done prior to collecting data under regulation 22A of this Annex in order to ensure the methodology and processes are in place prior to the beginning of the ship's first reporting period. Confirmation of compliance shall be provided to and retained on board the ship."

Regulation 22.2 reads as follows:

"2 On or before 31 December 2018, in the case of a ship of 5,000 gross tonnage and above, the SEEMP shall include a description of the methodology that will be used to collect the data required by regulation 22A.1 of this Annex and the processes that will be used to report the data to the ship's Administration."

Regulation 22.3 reads as follows:

"3 The SEEMP shall be developed taking into account guidelines adopted by the Organization."

Interpretation:

Ships that are delivered on or after 1 January 2019 should keep on board both a SEEMP that is in compliance with regulation 22.2 and confirmation of compliance as required by regulation 5.4.5.

2 Boil-off gas consumed on board ships

Regulation 2.9 reads as follows:

"9 *Fuel oil* means any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including gas, distillate and residual fuels."

Regulation 22A.1 reads as follows:

"1 From calendar year 2019, each ship of 5,000 gross tonnage and above shall collect the data specified in appendix IX to this Annex, for that and each subsequent calendar year or portion thereof, as appropriate, according to the methodology included in the SEEMP."

Appendix IX reads as follows:

"Fuel oil consumption, by fuel oil type in metric tonnes and methods used for collecting fuel oil consumption data"

Interpretation:

Data relating to Boil-off Gas (BOG) consumed on board the ship for propulsion or operation is required to be collected and reported as fuel as part of the Data Collection System for fuel oil consumption of ships.

3 Access to the disaggregated data

Regulation 22A.8 reads as follows:

"8 Except as provided for in paragraphs 4, 5 and 6 of this regulation, the disaggregated data that underlies the reported data noted in appendix IX to this Annex for the previous calendar year shall be readily accessible for a period of not less than 12 months from the end of that calendar year and be made available to the Administration upon request."

Interpretation:

The disaggregated data is not required to be kept onboard the ship provided that the disaggregated data can be made available by the Company.

ANNEX 9

PROGRAMME OF FOLLOW-UP ACTIONS OF THE INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS UP TO 2023

- 1 MEPC 72 adopted resolution MEPC.304(72) on *Initial IMO Strategy on reduction of GHG emissions from ships* (hereinafter the Initial Strategy).
- 2 The Initial Strategy identifies in paragraph 6.1 that "a programme of follow-up actions of the Initial Strategy should be developed".
- 3 The programme of follow-up actions is considered as a planning tool on the work for the Committee and its subsidiary bodies in meeting the timelines identified in the Initial Strategy, and includes expected timeframes.
- 4 The programme of follow-up actions set out in annex includes streams of activity¹ as follows:
 - .1 candidate short-term measures (Group A) that can be considered and addressed under existing IMO instruments;
 - .2 candidate short-term measures (Group B) that are not work in progress and are subject to data analysis;
 - .3 candidate short-term measures (Group C) that are not work in progress and are not subject to data analysis;
 - .4 candidate mid-/long-term measures and action to address the identified barriers;
 - .5 impacts on States;
 - .6 Fourth IMO GHG Study;
 - .7 capacity building, technical cooperation, research and development; and
 - .8 follow-up actions towards the development of the revised Strategy.
- 5 Detailed timelines for each stream of activity are provided in the annex.

¹ This programme of follow-up actions does not prejudge whether any further measures will be adopted nor does it preclude any further activity deemed necessary to implement the Initial Strategy, including additional intersessional work and technical groups, as appropriate.

ANNEX

Streams of activity	2018	2019	2020		2021	2022		2023
	MEPC 73	MEPC 74	MEPC 75	MEPC 76	MEPC 77	MEPC 78	MEPC 79	MEPC 80
Candidate short-term measures (Group A) that can be considered and addressed under existing IMO instruments¹	Invite concrete proposals	Consideration of proposals	Consideration and decisions on candidate short-term measures that can be considered and addressed under existing IMO instruments e.g. further improvement of the existing energy efficiency framework with a focus on EEDI and SEEMP, ITCP ²					
Candidate short-term measures (Group B) that are not work in progress and are subject to data analysis	Invite concrete proposals	Consideration of proposals	Consideration and decisions on candidate short-term measures that are not work in progress and are subject to data analysis, consistent with the Roadmap ³					
			Data analysis, in particular from the IMO Fuel Oil Consumption DCS					
Candidate short-term measures (Group C) that are not work in progress and are not subject to data analysis	Invite concrete proposals	Consideration of proposals	Consideration and decisions on candidate short-term measures that are not work in progress and are not subject to data analysis e.g. National Action Plans guidelines, lifecycle GHG/carbon intensity guidelines for fuels, research and development ³					
Candidate mid-/long-term measures and action to address the identified barriers	Invite concrete proposals	Consideration of proposals including identification of barriers and action to address	Progress made and timelines agreed on the development of mid- and long-term measures					
Impacts on States³	Invite concrete proposals	Finalization of procedure	Measure-specific impact assessment, as appropriate, consistent with the Initial Strategy, in particular paragraphs 4.10 to 4.13					
Fourth IMO GHG Study	Scope	Initiation of the Study	Progress report	Final report				
Capacity building, technical cooperation, research and development	Development and implementation of actions including support for assessment of impacts and support for implementation of measures							
Follow-up actions towards the development of the revised Strategy		Ship fuel oil consumption data collection pursuant to regulation 22A of MARPOL Annex VI (DCS)	Initiation of revision of the Initial Strategy taking into account IMO DCS data and other relevant information			Adoption of revised Strategy		

¹ Includes ongoing work pursuant to regulation 21.6 of MARPOL Annex VI.

² "In aiming for early action, the timeline for short-term measures should prioritize potential early measures that the Organization could develop, while recognizing those already adopted, including MARPOL Annex VI requirements relevant for climate change, with a view to achieve further reduction of GHG emissions from international shipping before 2023" (paragraph 4.2 of the Initial Strategy).

³ Assessment of impacts on States to be undertaken in accordance with the procedure to be developed by the Organization.

ANNEX 10

RESOLUTION MEPC.310(73) (adopted on 26 October 2018)

ACTION PLAN TO ADDRESS MARINE PLASTIC LITTER FROM SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE

RECALLING Article 38(e) of the Convention on the International Maritime Organization (the Organization) concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

ACKNOWLEDGING that work to prevent pollution by garbage from ships has been undertaken by the Organization since the adoption of MARPOL Annex V,

ACKNOWLEDGING ALSO the relevance of the work on marine plastic litter undertaken by the Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and its 1996 Protocol, including the adoption in 2016 of a "Recommendation to Encourage Action to Combat Marine Litter",

ACKNOWLEDGING FURTHER the relevant work of other international organizations in relation to marine plastic litter, in particular FAO and UN Environment, and the importance of existing cooperation mechanisms, including GESAMP, the Joint FAO/IMO Ad Hoc Working Group on IUU fishing and related matters, and the Global Partnership for Marine Litter,

RECALLING the United Nations 2030 Agenda for Sustainable Development, in particular Sustainable Development Goal (SDG) 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development,

RECALLING ALSO that the Assembly, at its thirtieth session, in December 2017, recognized the ongoing problem of marine plastic pollution, as addressed in MARPOL Annex V, which required further consideration as part of a global solution within the framework of ocean governance, in pursuance of the target of Sustainable Development Goal 14 to prevent and significantly reduce marine pollution of all kinds by 2025,

- 1 ADOPTS the Action Plan to address marine plastic litter from ships (hereinafter the Action Plan) as set out in the annex to the present resolution;
- 2 NOTES the application of the Action Plan to all ships, including fishing vessels;
- 3 INVITES the Secretary-General of the Organization to make adequate provisions in the Integrated Technical Cooperation Programme (ITCP) to support relevant follow-up actions of the Action Plan;
- 4 AGREES to keep the Action Plan under review, with a view to assessing, in 2023, the effectiveness of the actions within the Action Plan against the intended outcomes.

ANNEX

ACTION PLAN TO ADDRESS MARINE PLASTIC LITTER FROM SHIPS

1 Background

1.1 Marine plastic litter enters the marine environment as a result of a wide range of land- and sea-based activities. Both macroplastics (e.g. large plastic items such as plastic bags, water bottles and fishing gear) and microplastics (small plastic particles generally five millimetres or less in size) persist in the marine environment and result in harmful effects on marine life and biodiversity, as well as negative impacts on human health. In addition, marine plastic litter negatively impacts on activities such as tourism, fisheries and shipping. This plastic material has the potential to be brought back into the economy by means of reuse or recycling. Studies demonstrate that despite the existing regulatory framework to prevent marine plastic litter from ships discharges into the sea continue to occur.

1.2 IMO has recognized the importance of preventing pollution by garbage, including plastics, from ships since the adoption of MARPOL Annex V, as well as the dumping of various types of waste, including plastics, into the sea through the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention or LC) and its 1996 Protocol (London Protocol or LP). This commitment was reinforced by the IMO Assembly, at its thirtieth session, in December 2017, recognizing the ongoing problem of marine plastic pollution, as addressed in MARPOL Annex V, which required further consideration as part of a global solution within the framework of ocean governance, in pursuance of the target of Sustainable Development Goal 14 to prevent and significantly reduce marine pollution of all kinds by 2025.

1.3 IMO has committed to working closely with a number of partners to address the issue of marine plastic litter including, but not limited to:

- .1 FAO through the Joint FAO/IMO Ad Hoc Working Group on IUU Fishing and Related Matters (JWG);
- .2 the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP);
- .3 the UN Environment-managed Global Partnership on Marine Litter (GPML);
- .4 the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (ICP); and
- .5 the United Nations Environment Assembly (UNEA).

1.4 IMO recognizes the importance of continued action to manage this global issue with the development of an Action Plan to address marine plastic litter from ships. In addition, the thirty-eighth Consultative Meeting of Contracting Parties to the London Convention and the eleventh Meeting of Contracting Parties to the London Protocol adopted a "Recommendation to Encourage Action to Combat Marine Litter".

2 Objective

The Action Plan to address marine plastic litter from ships has been developed to contribute to the global solution for preventing marine plastic litter entering the oceans through ship-based activities. This Action Plan provides IMO with a mechanism to identify specific

outcomes, and actions to achieve these outcomes, in a way that is meaningful and measureable. The Action Plan builds on existing policy and regulatory frameworks, and identifies opportunities to enhance these frameworks and introduce new supporting measures to address the issue of marine plastic litter from ships.

3 Time frames

3.1 In line with the time frames provided in Sustainable Development Goal 14, the measures within this Action Plan should be completed by 2025.

3.2 Priority actions under this plan, to be pursued upon adoption of this plan, have been identified in the below table of actions. Further specific time frames for individual measures should be evaluated during the annual review and evaluation process by the Marine Environment Protection Committee.

4 Actions

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
1.	Reduction of marine plastic litter generated from, and retrieved by, fishing vessels	Consider making the IMO Ship Identification Number Scheme mandatory for all fishing vessels over 24 metres in length through an amendment to the Cape Town Agreement once it enters into force. Encourage the ratification of the Cape Town agreement	MSC / MEPC			
2.		Consider making mandatory, through an appropriate IMO instrument (e.g. MARPOL Annex V), the marking of fishing gear with the IMO Ship Identification Number, in cooperation with the Food and Agriculture Organization of the United Nations (FAO)	MEPC	PPR / III (JWG)		FAO
3.		Further investigate logging of the identification number for each item of fishing gear on board a fishing vessel	MEPC	PPR / III		FAO
4.		Preparation of a circular reminding IMO Member States to collect information from their registered fishing vessels regarding any discharge or accidental loss of fishing gear	MEPC	PPR		
5.		Consider the development of best management practice to facilitate incentives for fishing vessels to retrieve derelict fishing gear and deliver it to port reception facilities, in collaboration with FAO	MEPC / MSC	PPR / III (JWG) / SDC		FAO

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
6.		Consider the issue of waste that has been collected during fishing operations building on experience gathered from established projects	MEPC	PPR		
7.		Review the application of placards, garbage management plans and garbage record-keeping (regulation 10, MARPOL Annex V), for example making the Garbage Record Book mandatory for ships of 100 GT and above	MEPC	PPR		
8.		Preparation of a circular reminding Member States to enforce MARPOL Annex V on fishing vessels through PSC measures. Encourage port State control MoUs to develop PSC procedures that include fishing vessels	MEPC	PPR / III		
9.	Reduction of shipping's contribution to marine plastic litter	Review the application of placards, garbage management plans and garbage record-keeping (regulation 10, MARPOL Annex V), for example making the Garbage Record Book mandatory for ships of 100 GT and above	MEPC	PPR		
10		Consider the establishment of a compulsory system of formatted declarations of the loss of containers and the means on board to easily identify the exact number of losses Also, consider establishing an obligation to report through a standardized procedure the loss of containers	MSC / MEPC		X	

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
11		Consider ways to communicate the location of containers lost overboard based on additional information to be provided by interested parties	MEPC			
12		Consider the most appropriate instrument to address the responsibility and liability for plastic consumer goods lost at sea from ships	LEG / MEPC	PPR		
13		Consider enhancing the enforcement of MARPOL Annex V, including, where possible, through a risk-based approach	MEPC	PPR / III		
14	Improvement of the effectiveness of port reception and facilities and treatment in reducing marine plastic litter	Consider the requirement for port reception facilities to provide for separate garbage collection for plastic waste from ships, including fishing gear to facilitate reuse or recycling	MEPC	PPR		
15		Consider mechanisms to enhance the enforcement of MARPOL Annex V requirements for the delivery of garbage to reception facilities	MEPC	PPR		

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
16		<p>Consider the development of tools to support the implementation of cost frameworks associated with port reception facilities, taking into account the need to not create disincentives for the use of port reception facilities, the potential benefits of cost incentives that provide no additional fees based on volume and identifying waste types that can be reduced, reused or recycled through schemes that identify waste revenue</p>	MEPC	PPR		
17		<p>IMO to encourage Member States to effectively implement their obligation to provide adequate facilities at ports and terminals for the reception of garbage, as required by regulation 8 of MARPOL Annex V</p> <p>Consider facilitating the mandatory use of port waste management plans to ensure the provision of adequate waste reception facilities</p> <p>Encourage Member States to address the entire process of plastic garbage handling and ensure that landed garbage is managed in a sustainable manner ashore</p> <p>Identify information from the port waste management plans that can be shared via the Global Integrated Shipping Information System (GISIS)</p> <p>Take into consideration work being undertaken under the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972</p>	MEPC	PPR / III		

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
		(London Convention or LC) and its 1996 Protocol (London Protocol or LP) (LC/LP) on this issue				
18		Further consider the impact on Small Island Developing States and on remote locations such as polar regions when planning for the disposal of waste to land-based facilities	MEPC	PPR		
19	Enhanced public awareness, education and seafarer training	Consider ways to promote the work of IMO to address marine plastic litter generated from ships	MEPC	PPR		
20		Consider tasking the HTW Sub-Committee with reviewing chapter III of STCW-F (Basic safety training for all fishing vessel personnel) to ensure that all fishing vessel personnel, before being assigned any shipboard duties, receive basic training on marine environment awareness oriented on marine plastic litter including abandoned, lost or otherwise discarded fishing gear (ALDFG)	MEPC	HTW		
21		Consider how the model course "Marine Environmental Awareness 1.38" could be amended/revised to specifically address marine plastic litter Further consider how to ensure familiarization of all seafarers within the existing STCW (International Convention on Standards and Training, Certification and Watch keeping for Seafarers) minimum requirements and taking into account existing best practice, guidelines and programmes	MEPC	HTW / PPR		

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
22	Improved understanding of the contribution of ships to marine plastic litter	Consider extending the reporting requirement in regulation 10.6 of MARPOL Annex V to include reporting data on discharge or accidental loss of fishing gear by the flag State to IMO via GISIS or other means if appropriate	MEPC	PPR / III		
23		Encourage Member States and international organizations that have conducted any scientific research related to marine litter to share the results of such research, including any information on the areas contaminated by marine litter from ships	MEPC	PPR	X	
24		Conduct a study on marine plastic litter, including macro and microplastics, from all ships	MEPC LC/LP	PPR	X	GESAMP, FAO, UN Environment, RFMOs, World Oceans Assessment, Regional Seas Conventions
25		Invite Member States and international organizations to undertake studies to better understand microplastics from ships			X	

	Outcome	Measures	Parent Organ	Coordinating/ Associated Organ	Priority	Associated partners
26	Improved understanding of the regulatory framework associated with marine plastic litter from ships	Consider the development of a regulatory framework matrix for the purpose of a gap analysis	MEPC	PPR / III	X	
27	Strengthened international cooperation	Make information available to the United Nations Environment Assembly (UNEA)	MEPC LC/LP	PPR		
28		Continue work with other United Nations bodies and agencies, as well as with international fora, which are active in the matter of marine plastic litter from shipping, such as through the Global Partnership on Marine Litter (GPML)	MEPC LC/LP	PPR	X	
29	Targeted technical cooperation and capacity-building	Address implementation issues related to the action plan to address marine plastic litter from ships in the context of IMO technical cooperation and capacity-building activities	MEPC TCC	PPR / III		
30		Consider the establishment of externally funded major projects under the auspices of IMO in support of the action plan to address marine plastic litter from ships	MEPC	PPR		

5 Review and Evaluation

5.1 This Action Plan will be reviewed periodically to ensure that it continues to deliver against the objective and outcomes identified within the plan. Periodic review and evaluation of the plan will facilitate assessing the effectiveness of the actions within the plan, updating the plan with new information and incorporating new actions identified based on the implementation of the Action Plan or as a result of new information.

5.2 IMO will undertake a review of the Action Plan (i.e. assess the need for updating actions and/or incorporating new actions to the plan) annually and a comprehensive review (i.e. assessing the effectiveness of the actions within the plan against the objective and outcomes identified within the plan) after five years.

ANNEX 11

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

Chapter 15

Special requirements

- 1 Section 15.15 is replaced by the following:

"15.15 Hydrogen sulphide (H₂S) detection equipment for bulk liquids

Hydrogen sulphide (H₂S) detection equipment shall be provided on board ships carrying bulk liquids prone to H₂S formation. It should be noted that scavengers and biocides, when used, may not be a 100% effective in controlling the formation of H₂S."

Chapter 16

Operational requirements

- 2 Paragraph 16.2.7 is replaced by the following:

"16.2.7 Where *column o* in the table of chapter 17 refers to this paragraph, the cargo is subject to the prewash requirements in regulation 13.7.1.4 of Annex II of MARPOL"

- 3 The complete text of chapters 17, 18 and 19 is replaced by the following:

"Chapter 17

Summary of minimum requirements

17.1 Mixtures of noxious liquid substances presenting pollution hazards only, and which are assessed or provisionally assessed under regulation 6.3 of MARPOL Annex II, may be carried under the requirements of the Code applicable to the appropriate position of the entry in this chapter for Noxious Liquid Substances, not otherwise specified (n.o.s.).

17.2 EXPLANATORY NOTES

Product name (column a)	The product name shall be used in the shipping document for any cargo offered for bulk shipments. Any additional name may be included in brackets after the product name. In some cases, the product names are not identical with the names given in previous issues of the Code.
UN Number (column b)	Deleted
Pollution Category (column c)	The letter X, Y, Z means the Pollution Category assigned to each product under MARPOL Annex II.
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 (2.1.2.1) 2: ship type 2 (2.1.2.2) 3: ship type 3 (2.1.2.3)
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)
Tank vents (column g)	Cont.: controlled venting Open: open venting
Tank environmental control (column h)	Inert: inerting (9.1.2.1) Pad: liquid or gas padding (9.1.2.2) Dry: drying (9.1.2.3) Vent: natural or forced ventilation (9.1.2.4) No: no special requirements under this Code (inerting may be required under SOLAS)
Electrical equipment (column i)	Temperature classes (i') T1 to T6 - indicates no requirements blank no information Apparatus group (i'') IIA, IIB or IIC: - indicates no requirements blank no information Flash point (i''') Yes: flashpoint exceeding 60°C (10.1.6) No: flashpoint not exceeding 60°C (10.1.6) NF: nonflammable product (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)
Vapour detection (column k)	F: flammable vapours T: toxic vapours No: indicates no special requirements under this Code
Fire protection (column l)	A: alcohol-resistant foam or multi-purpose foam B: regular foam; encompasses all foams that are not of an alcohol-resistant type, including fluoro-protein and aqueous-film-forming foam (AFFF) C: water-spray D: dry chemical No: no special requirements under this Code
Materials of construction (column m)	Deleted
Emergency equipment (column n)	Yes: see 14.3.1 No: no special requirements under this Code
Specific and operational requirements (column o)	When specific reference is made to chapters 15 and/or 16, these requirements shall be additional to the requirements in any other column.

a	c	d	e	f	g	h	i'	ii''	iii'''	j	k	l	n	o
Acetic acid	Z	S/P	3	2G	Cont	No	T1	IIA	No	C	F	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.17, 15.19, 16.2.9
Acetic anhydride	Z	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.19.6
Acetochlor	X	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.9
Acetone cyanohydrin	Y	S/P	1	1G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.13, 15.17, 15.19, 16.6.1, 16.6.2, 16.6.3
Acetonitrile	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Acetonitrile (Low purity grade)	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Acid oil mixture from soyabean, corn (maize) and sunflower oil refining	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Acrylamide solution (50% or less)	Y	S/P	3	2G	Cont	No			NF	C	T	No	No	15.12, 15.13, 15.17, 15.19, 16.2.9, 16.6.1
Acrylic acid	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.13, 15.17, 15.19, 16.2.9, 16.6.1
Acrylic acid/ethenesulphonic acid copolymer with phosphonate groups, sodium salt solution copolymer with phosphonate groups, sodium salt solution	Z	P	3	2G	Open	No			Yes	O	No	ABC	No	
Acrylonitrile	Y	S/P	2	2G	Cont	No	T1	IIB	No	C	FT	AC	Yes	15.12, 15.13, 15.17, 15.19
Acrylonitrile-Styrene copolymer dispersion in polyether polyol	Y	P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Adiponitrile	Z	S/P	2	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Alachlor technical (90% or more)	X	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6, 16.2.9
Alcohol (C9-C11) poly (2.5-9) ethoxylate	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Alcohol (C6-C17) (secondary) poly(3-6)ethoxylates	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Alcohol (C6-C17) (secondary) poly(7-12)ethoxylates	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Alcohol (C10-C18) poly(7) ethoxylate	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Alcohol (C12-C16) poly(1-6)ethoxylates	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Alcohol (C12-C16) poly(20+)ethoxylates	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Alcohol (C12-C16) poly(7-19)ethoxylates	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Alcohols (C13+)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Alcohols (C12+), primary, linear	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alcohols (C8-C11), primary, linear and essentially linear	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Alcohols (C12-C13), primary, linear and essentially linear	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alcohols (C14-C18), primary, linear and essentially linear	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Alkanes (C5-C7), linear and branched	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Alkanes (C6-C9)	X	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
Alkanes (C10-C17), linear and branched	Y	S/P	2	2G	Cont	Inert	T3	IIB	No	R	F	ABC	No	15.19
Alkanes (C10-C26), linear and branched (flashpoint ≤60°C)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6

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Iso- and cyclo-alkanes (C10-C11)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Iso- and cyclo-alkanes (C12+)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Alkanes (C10-C26), linear and branched, (flashpoint >60°C)	Y	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
n-Alkanes (C9-C11)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
n-Alkanes (C10 – C20)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alkaryl polyethers (C9-C20)	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6
Alkenoic acid, polyhydroxy ester borated	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Alkenyl (C11+) amide	X	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alkenyl (C16-C20) succinic anhydride	Z	S/P	3	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Alkyl acrylate/vinylpyridine copolymer in toluene	Y	S/P	2	2G	Cont	No	T1	IIB	No	C	FT	ABC	No	15.12, 15.17, 15.19.6, 16.2.9
Alkylaryl phosphate mixtures (more than 40% Diphenyl tolyl phosphate, less than 0.02% ortho-isomers)	X	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Alkylated (C4-C9) hindered phenols	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Alkylbenzene, alkylindane, alkylindene mixture (each C12-C17)	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Alkyl benzene distillation bottoms	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Alkylbenzene mixtures (containing at least 50% of toluene)	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6

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Alkylbenzenes mixtures (containing naphthalene)	X	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Alkyl (C3-C4) benzenes	Y	S/P	2	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Alkyl (C5-C8) benzenes	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Alkyl(C9+)benzenes	Y	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Alkyl (C11-C17) benzene sulphonic acid	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Alkylbenzene sulphonic acid, sodium salt solution	Y	S/P	2	2G	Cont	No	-	-	NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Alkyl/cyclo (C4-C5) alcohols	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Alkyl (C10-C15, C12 rich) phenol poly (4-12) ethoxylate	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Alkyl (C12+) dimethylamine	X	S/P	1	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Alkyl dithiocarbamate (C19-C35)	Y	P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alkyldithiothiadiazole (C6-C24)	Y	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.6
Alkyl ester copolymer (C4-C20)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Alkyl (C7-C9) nitrates	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 15.20, 16.6.1, 16.6.2, 16.6.3
Alkyl (C8-C10)/(C12-C14):(40% or less/60% or more) polyglucoside solution (55% or less)	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Alkyl (C8-C10)/(C12-C14):(60% or more/40% or less) polyglucoside solution(55% or less)	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Alkyl(C7-C11)phenol poly(4-12) ethoxylate	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6

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Alkyl (C8-C40) phenol sulphide	Z	S/P	3	2G	Open	No			Yes	O	No	ABC	No	
Alkyl (C8-C9) phenylamine in aromatic solvents	Y	S/P	2	2G	Cont	No	T1	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Alkyl (C9-C15) phenyl propoxylate	Z	S/P	3	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Alkyl (C8-C10) polyglucoside solution (65% or less)	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Alkyl (C8-C10)/(C12-C14):(50%/50%) polyglucoside solution (55% or less)	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Alkyl (C12-C14) polyglucoside solution (55% or less)	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Alkyl (C12-C16) propoxyamine ethoxylate	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6
Alkyl (C10-C20, saturated and unsaturated) phosphite	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Alkyl sulphonic acid ester of phenol	Y	P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Alkyl (C18+) toluenes	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.9
Alkyl(C18-C28) toluenesulphonic acid	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.19, 16.2.6, 16.2.9
Alkyl(C18-C28) toluenesulphonic acid, calcium salts, borated	Y	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Alkyl (C18-C28) toluenesulfonic acid, calcium salts, low overbase	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Alkyl (C18-C28) toluenesulphonic acid, calcium salts, high overbase	Y	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Allyl alcohol	Y	S/P	2	2G	Cont	No	T2	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Allyl chloride	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19

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Aluminium chloride/Hydrogen chloride solution	Y	S/P	2	2G	Cont	No	-	-	NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19
Aluminium hydroxide, sodium hydroxide, sodium carbonate solution (40% or less)	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19
Aluminium sulphate solution	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19
2-(2-Aminoethoxy) ethanol	Z	S/P	3	2G	Cont	No			Yes	C	T	AD	Yes	15.12, 15.17, 15.19
Aminoethyldiethanolamine/Aminoethylethanolamine solution	Z	S/P	3	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Aminoethyl ethanolamine	Z	S/P	3	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19
N-Aminoethylpiperazine	Z	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
2-Amino-2-methyl-1-propanol	Z	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Ammonia aqueous (28% or less)	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19
Ammonium chloride solution (less than 25%) (*)	Z	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	
Ammonium hydrogen phosphate solution	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Ammonium lignosulphonate solutions	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Ammonium nitrate solution (93% or less) (*)	Z	S/P	2	1G	Cont	No			NF	R	T	No	No	15.2, 15.11.4, 15.11.6, 15.12.3, 15.12.4, 15.18, 15.19.6, 16.2.9
Ammonium polyphosphate solution	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Ammonium sulphate solution	Z	P	3	2G	Open	No			NF	O	No	No	No	
Ammonium sulphide solution (45% or less) (*)	Y	S/P	2	2G	Cont	Inert	T4	IIB	No	C	FT	AC	No	15.12, 15.17, 15.19, 16.6.1, 16.6.2, 16.6.3
Ammonium thiosulphate solution (60% or less)	Z	S/P	3	2G	Open	No			NF	O	No	No	No	
Amyl acetate (all isomers)	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
n-Amyl alcohol	Z	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	ABC	Yes	15.12, 15.17, 15.19
Amyl alcohol, primary	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
sec-Amyl alcohol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
tert-Amyl alcohol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
tert-Amyl ethyl ether	Z	P	3	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
tert-Amyl methyl ether	X	S/P	2	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Aniline	Y	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Aryl polyolefins (C11-C50)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Aviation alkylates (C8 paraffins and iso-paraffins BPT 95 - 120°C)	X	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
Barium long chain (C11-C50) alkaryl sulphonate	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19, 16.2.6, 16.2.9

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Benzene and mixtures having 10% benzene or more (i)	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6, 16.2.9
Benzene sulphonyl chloride	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Benzenetricarboxylic acid, trioctyl ester	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Benzyl acetate	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Benzyl alcohol	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Benzyl chloride	Y	S/P	2	2G	Cont	No	T1	IIA	No	C	FT	ABC	Yes	15.12, 15.13, 15.17, 15.19
Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint >60°C (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint ≤ 60°C (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and FAME (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and vegetable oil (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Gasoline and Ethyl alcohol (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	AC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of jet fuels and Alkanes (C10-C17), linear and branched (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	T3	IIB	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Bis(2-ethylhexyl) terephthalate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Brake fluid base mix: Poly(2-8)alkylene (C2-C3) glycols/Polyalkylene (C2-C10) glycols monoalkyl (C1-C4) ethers and their borate esters	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Bromochloromethane	Z	P	3	2G	Open	No			NF	O	No	No	No	
Butene oligomer	X	P	2	2G	Cont	No	T4	IIB	No	R	F	ABC	No	15.19.6
2-Butoxyethanol (58%)/Hyperbranched polyesteramide (42%) (mixture)	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12.3, 15.12.4, 15.19
Butyl acetate (all isomers)	Y	P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Butyl acrylate (all isomers)	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
tert-Butyl alcohol	Z	P	3	2G	Cont	No	T1	IIA	No	R	F	AC	No	15.19.6
Butylamine (all isomers)	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Butylbenzene (all isomers)	X	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Butyl benzyl phthalate	X	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Butyl butyrate (all isomers)	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	Y	S/P	2	2G	Open	No	T3	IIA	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
Butylene glycol	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
1,2-Butylene oxide	Y	S/P	3	2G	Cont	Inert	T2	IIB	No	C	FT	AC	No	15.8.1 to 15.8.7, 15.8.12, 15.8.13, 15.8.16, 15.8.17, 15.8.18, 15.8.19, 15.8.21, 15.8.25, 15.8.27, 15.8.29, 15.12, 15.17, 15.19.6
n-Butyl ether	Y	S/P	3	2G	Cont	Inert	T4	IIB	No	R	F	AC	No	15.4.6, 15.19
Butyl methacrylate	Z	S/P	3	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
n-Butyl propionate	Y	P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Butyraldehyde (all isomers)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Butyric acid	Y	S/P	3	2G	Cont	No			Yes	O	No	AC	No	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.19.6
gamma-Butyrolactone	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Calcium alkaryl sulphonate (C11-C50)	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	
Calcium alkyl (C10-C28) salicylate	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Calcium hydroxide slurry	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Calcium hypochlorite solution (15% or less)	Y	S/P	2	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19.6
Calcium hypochlorite solution (more than 15%)	X	S/P	1	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19
Calcium lignosulphonate solutions	Z	P	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Calcium long-chain alkyl (C5-C10) phenate	Y	P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Calcium long-chain alkyl (C11-C40) phenate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Calcium long-chain alkyl phenate sulphide (C8-C40)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Calcium long-chain alkyl salicylate (C13+)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Calcium long-chain alkyl (C18-C28) salicylate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Calcium nitrate/Magnesium nitrate/Potassium chloride solution	Z	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Calcium nitrate solution (50% or less)	Z	S	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Camelina oil	Y	S/P	2(k)	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7
epsilon-Caprolactam (molten or aqueous solutions)	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Carbolic oil	Y	S/P	2	2G	Cont	No			Yes	C	FT	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Carbon disulphide	Y	S/P	1	1G	Cont	Pad+inert	T6	IIC	No	C	FT	C	Yes	15.3, 15.12, 15.17, 15.18, 15.19
Carbon tetrachloride	Y	S/P	2	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19.6
Cashew nut shell oil (untreated)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.7, 16.2.9
Castor oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Cesium formate solution (*)	Y	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	15.19.6
Cetyl/Eicosyl methacrylate mixture	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.13, 15.19.6, 16.2.9, 16.6.1, 16.6.2

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Chlorinated paraffins (C10-C13)	X	S/P	1	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19, 16.2.6
Chlorinated paraffins (C14-C17) (with 50% chlorine or more, and less than 1% C13 or shorter chains)	X	S/P	1	2G	Cont	No	-	-	Yes	C	T	AC	No	15.12, 15.17, 15.19
Chloroacetic acid (80% or less)	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.18, 15.19, 16.2.9
Chlorobenzene	Y	S/P	2	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Chloroform	Y	S/P	3	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19.6
Chlorohydrins (crude)	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19
4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt solution	Y	S/P	2	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
o-Chloronitrobenzene	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12.3, 15.12.4, 15.19, 16.2.6, 16.2.9
1-(4-Chlorophenyl)-4,4- dimethyl-pentan-3-one	Y	S/P	2	2G	Open	No			Yes	O	No	ABD	No	15.19.6, 16.2.6, 16.2.9
2- or 3-Chloropropionic acid	Z	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.19, 16.2.9
Chlorosulphonic acid	Y	S/P	1	2G	Cont	No			NF	C	T	No	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.5, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.16.2, 15.17, 15.18, 15.19
m-Chlorotoluene	Y	S/P	2	2G	Cont	No	T4	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19
o-Chlorotoluene	Y	P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
p-Chlorotoluene	Y	P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6, 16.2.9

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Chlorotoluenes (mixed isomers)	Y	P	2	2G	Cont	No	T4	IIA	No	R	F	ABC	No	15.19.6
Choline chloride solutions	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Citric acid (70% or less)	Z	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Coal tar	X	S/P	2	2G	Cont	No	T2	IIA	Yes	C	T	BD	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Coal tar naphtha solvent	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6, 16.2.9
Coal tar pitch (molten) (*)	X	S/P	2	1G	Cont	No	T2	IIA	Yes	C	T	ABCD	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Cocoa butter	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Coconut oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Coconut oil fatty acid	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Coconut oil fatty acid methyl ester	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Copper salt of long chain (C17+) alkanolic acid	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Corn oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Cotton seed oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Creosote (coal tar)	X	S/P	1	2G	Cont	No	T2	IIA	Yes	C	T	AD	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Cresols (all isomers)	Y	S/P	1	2G	Cont	No	T1	IIA	Yes	C	T	ABC	Yes	15.12, 15.18, 15.19, 16.2.9
Cresol/Phenol/Xylenol mixture	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19

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Cresylic acid, dephenolized	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Cresylic acid, sodium salt solution	Y	S/P	2	2G	Cont	No	T4	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Crotonaldehyde	X	S/P	1	1G	Cont	No	T3	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.18, 15.19
1,5,9-Cyclododecatriene	X	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.13, 15.19.6, 16.6.1, 16.6.2
Cycloheptane	X	S/P	2	2G	Cont	No	T4	IIA	No	R	F	AC	No	15.19.6
Cyclohexane	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6, 16.2.9
Cyclohexane-1,2-dicarboxylic acid, diisononyl ester	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Cyclohexane oxidation products, sodium salts solution	Z	P	3	2G	Open	No			NF	O	No	No	No	
Cyclohexanol	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Cyclohexanone	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Cyclohexanone, Cyclohexanol mixture	Y	S/P	3	2G	Cont	No			Yes	R	F	AC	No	15.19.6
Cyclohexyl acetate	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Cyclohexylamine	Y	S/P	3	2G	Cont	No	T3	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19
1,3-Cyclopentadiene dimer (molten)	Y	S/P	2	2G	Cont	No	T1	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19, 16.2.6, 16.2.9
Cyclopentane	Y	P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Cyclopentene	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
p-Cymene	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Decahydronaphthalene	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6

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Decanoic acid	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Decene	X	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Decyl acrylate	X	S/P	1	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.13, 15.19, 16.6.1, 16.6.2
Decyl alcohol (all isomers)	Y	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9(e)
Decyl/Dodecyl/Tetradecyl alcohol mixture	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Decyloxytetrahydrothiophene dioxide	X	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Diacetone alcohol	Z	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Dialkyl (C8-C9) diphenylamines	Z	P	3	2G	Open	No			Yes	O	No	ABC	No	
Dialkyl (C7-C13) phthalates	X	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6
Dialkyl (C9-C10) phthalates	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Dialkyl thiophosphates sodium salts solution	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
2,6-Diaminohexanoic acid phosphonate mixed salts solution	Z	S/P	3	2G	Cont	No			NF	R	No	No	No	15.11, 15.17, 15.19.6
Dibromomethane	Y	S/P	2	2G	Open	No			NF	O	No	No	No	15.19.6
Dibutylamine	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	ABC	Yes	15.12, 15.17, 15.19
Dibutyl hydrogen phosphonate	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
2,6-Di-tert-butylphenol	X	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.9

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Dibutyl phthalate	X	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Dibutyl terephthalate	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.9
Dichlorobenzene (all isomers)	X	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	ABD	No	15.12, 15.17, 15.19.6
3,4-Dichloro-1-butene	Y	S/P	2	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
1,1-Dichloroethane	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Dichloroethyl ether	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.18, 15.19
1,6-Dichlorohexane	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
2,2'-Dichloroisopropyl ether	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19
Dichloromethane	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
2,4-Dichlorophenol	Y	S/P	2	2G	Cont	Dry			Yes	C	T	AD	Yes	15.12, 15.16.2, 15.17, 15.19, 16.2.6, 16.2.9
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.9
2,4-Dichlorophenoxyacetic acid, dimethylamine salt solution (70% or less)	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.9
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
1,1-Dichloropropane	Y	S/P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
1,2-Dichloropropane	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
1,3-Dichloropropene	X	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	ABC	Yes	15.12, 15.17, 15.19
Dichloropropene/Dichloropropane mixtures	X	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	ABD	No	15.12, 15.17, 15.19

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
2,2-Dichloropropionic acid	Y	S/P	2	2G	Cont	Dry			Yes	C	T	AD	Yes	15.11.2, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.16.2, 15.17, 15.19, 16.2.9
Dicyclopentadiene, Resin Grade, 81-89%	Y	S/P	2	2G	Cont	Inert	T2	IIB	No	C	FT	ABC	Yes	15.12, 15.13, 15.17, 15.19
Diethanolamine	Y	S/P	3	2G	Cont	No	T1	IIA	Yes	C	T	AC	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Diethylamine	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Diethylaminoethanol	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
2,6-Diethylaniline	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Diethylbenzene	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Diethylene glycol	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Diethylene glycol dibutyl ether	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Diethylene glycol diethyl ether	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Diethylene glycol phthalate	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Diethylenetriamine	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19
Diethylenetriaminepentaacetic acid, pentasodium salt solution	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Diethyl ether (*)	Z	S/P	2	1G	Cont	Inert	T4	IIB	No	R	F	AC	No	15.4, 15.14, 15.19
Di-(2-ethylhexyl) adipate	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Di-(2-ethylhexyl) phosphoric acid	Y	S/P	2	2G	Cont	No			Yes	R	T	AD	No	15.12.3, 15.12.4, 15.19.6

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Diethyl phthalate	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6
Diethyl sulphate	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Diglycidyl ether of bisphenol A	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Diglycidyl ether of bisphenol F	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6, 16.2.6
Diheptyl phthalate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Di-n-hexyl adipate	X	S/P	1	2G	Open	No			Yes	O	No	AC	No	15.19
Dihexyl phthalate	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Diisobutylamine	Y	S/P	2	2G	Cont	No	T4	IIB	No	C	FT	ABC	No	15.12.3, 15.12.4, 15.19
Diisobutylene	Y	P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Diisobutyl ketone	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Diisobutyl phthalate	X	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Diisononyl adipate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
Diisooctyl phthalate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Diisopropanolamine	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Diisopropylamine	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.17, 15.19.6
Diisopropylbenzene (all isomers)	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Diisopropyl-naphthalene	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
N,N-Dimethylacetamide	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
N,N-Dimethylacetamide solution (40% or less)	Z	S/P	3	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19.6
Dimethyl adipate	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9

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Dimethylamine solution (45% or less)	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19
Dimethylamine solution (greater than 45% but not greater than 55%)	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19
Dimethylamine solution (greater than 55% but not greater than 65%)	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.14, 15.19
N,N-Dimethylcyclohexylamine	Y	S/P	2	2G	Cont	No	T3	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Dimethyl disulphide	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
N,N-Dimethyldodecylamine	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Dimethylethanolamine	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Dimethylformamide	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
Dimethyl glutarate	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Dimethyl hydrogen phosphite	Y	S/P	3	2G	Cont	No	T4	IIB	No	R	F	AC	No	15.19.6
Dimethyl octanoic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Dimethyl phthalate	Y	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Dimethylpolysiloxane	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
2,2-Dimethylpropane-1,3-diol (molten or solution)	Z	P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	16.2.9
Dimethyl succinate	Y	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9

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Dinitrotoluene (molten)	X	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19, 15.21, 16.2.6, 16.2.9, 16.6.4
Dinonyl phthalate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
Diocetyl phthalate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
1,4-Dioxane	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12, 15.17, 15.19.6, 16.2.9
Dipentene	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Diphenyl	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Diphenylamine (molten)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Diphenylamine, reaction product with 2,2,4-Trimethylpentene	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19, 16.2.6
Diphenylamines, alkylated	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19, 16.2.6, 16.2.9
Diphenyl/Diphenyl ether mixtures	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Diphenyl ether	X	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Diphenyl ether/Diphenyl phenyl ether mixture	X	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Diphenylmethane diisocyanate	Y	S/P	2	2G	Cont	Dry	-	-	Yes(a)	C	T(a)	AB(b)D	Yes	15.12, 15.16.2, 15.17, 15.19, 16.2.6, 16.2.9
Diphenylol propane-epichlorohydrin resins	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Di-n-propylamine	Y	S/P	2	2G	Cont	No	T3	IIB	No	C	FT	AC	Yes	15.12.3, 15.12.4, 15.17, 15.19.6
Dipropylene glycol	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Dithiocarbamate ester (C7-C35)	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6

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Ditridecyl adipate	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Ditridecyl phthalate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
Diundecyl phthalate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Dodecane (all isomers)	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
tert-Dodecanethiol	Y	S/P	3	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
1-Dodecene	Y	S/P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Dodecene (all isomers)	X	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Dodecyl alcohol	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
n-Dodecyl mercaptan	X	S/P	1	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Dodecylamine/Tetradecylamine mixture	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Dodecylbenzene	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Dodecyl diphenyl ether disulphonate solution	X	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.6
Dodecyl hydroxypropyl sulphide	X	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6
Dodecyl methacrylate	Y	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.13, 15.19.6
Dodecyl/Octadecyl methacrylate mixture	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.13, 15.19.6, 16.2.6, 16.6.1, 16.6.2
Dodecyl/Pentadecyl methacrylate mixture	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
Dodecyl phenol	X	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6
Dodecyl Xylene	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6

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Drilling brines (containing zinc chloride)	X	S/P	2	2G	Open	No			NF	O	No	No	Yes	15.19.6
Drilling brines (containing calcium bromide)	Z	S/P	3	2G	Open	No			NF	O	No	No	No	15.19.6
Epichlorohydrin	Y	S/P	2	2G	Cont	No	T2	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Ethanolamine	Y	S/P	3	2G	Cont	No	T2	IIA	Yes	C	FT	AC	Yes	15.12, 15.17, 15.19, 16.2.9
2-Ethoxyethyl acetate	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
Ethoxylated long chain (C16+) alkyloxyalkylamine	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Ethoxylated tallow amine (>95%)	X	S/P	2	2G	Cont	Inert	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Ethyl acetate	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Ethyl acetoacetate	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	
Ethyl acrylate	Y	S/P	2	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12, 15.13, 15.17, 15.19, 16.6.1, 16.6.2
Ethylamine (*)	Y	S/P	2	1G	Cont	No	T2	IIA	No	C	F	AC	No	15.12.3.2, 15.14, 15.19
Ethylamine solutions (72% or less)	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	F	AC	No	15.12.3.2, 15.14, 15.19
Ethyl amyl ketone	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Ethylbenzene	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
Ethyl tert-butyl ether	Y	S/P	2	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Ethyl butyrate	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Ethylcyclohexane	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
N-Ethylcyclohexylamine	Y	S/P	2	2G	Cont	No	T3	IIB	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19
S-Ethyl dipropylthiocarbamate	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6, 16.2.9

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Ethylene carbonate	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Ethylene chlorohydrin	Y	S/P	1	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.18, 15.19
Ethylene cyanohydrin	Y	S/P	2	2G	Cont	No		IIB	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Ethylenediamine	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Ethylenediaminetetraacetic acid, tetrasodium salt solution	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Ethylene dibromide	Y	S/P	2	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19, 16.2.9
Ethylene dichloride	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19
Ethylene glycol	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Ethylene glycol acetate	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Ethylene glycol butyl ether acetate	Y	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Ethylene glycol diacetate	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6
Ethylene glycol methyl ether acetate	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Ethylene glycol monoalkyl ethers	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19, 16.2.9
Ethylene glycol phenyl ether	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9,
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Ethylene glycol (>75%)/sodium alkyl carboxylates/borax mixture	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Ethylene glycol (>85%)/sodium alkyl carboxylates mixture	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
Ethylene oxide/Propylene oxide mixture with an ethylene oxide content of not more than 30% by mass	Y	S/P	2	1G	Cont	Inert	T2	IIB	No	C	FT	AC	Yes	15.8, 15.12, 15.14, 15.17, 15.19
Ethylene-vinyl acetate copolymer (emulsion)	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Ethyl-3-ethoxypropionate	Y	P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
2-Ethylhexanoic acid	Y	S/P	3	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
2-Ethylhexyl acrylate	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.13, 15.19.6, 16.6.1, 16.6.2
2-Ethylhexylamine	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19.6
2-Ethyl-2-(hydroxymethyl) propane-1,3-diol (C8-C10) ester	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Ethylidene norbornene	Y	S/P	2	2G	Cont	No	T3	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Ethyl methacrylate	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
N-Ethylmethylallylamine	Y	S/P	2	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19
Ethyl propionate	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
2-Ethyl-3-propylacrolein	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6, 16.2.9
Ethyl toluene	Y	P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
Fatty acid (saturated C13+)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Fatty acid methyl esters (m)	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9

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Fatty acids, (C8-C10)	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Fatty acids, (C12+)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Fatty acids, (C16+)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Fatty acids, essentially linear (C6-C18) 2-ethylhexyl ester	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Ferric chloride solutions	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19, 16.2.9
Ferric nitrate/Nitric acid solution	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19
Fish oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Fish silage protein concentrate (containing 4% or less formic acid)	Y	P	2	2G	Open	No			NF	O	No	No	No	15.19.6, 16.2.6
Fish protein concentrate (containing 4% or less formic acid)	Z	P	3	2G	Open	No	-	-	NF	O	No	No	No	
Fluorosilicic acid solution (20-30%)	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19
Formaldehyde solutions (45% or less)	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Formamide	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6, 16.2.9
Formic acid (85% or less acid)	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T(g)	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.17, 15.19, 16.2.9
Formic acid (over 85%)	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT(g)	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.17, 15.19, 16.2.9

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Formic acid mixture (containing up to 18% propionic acid and up to 25% sodium formate)	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T(g)	AC	No	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.12.4, 15.19.6
Furfural	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Furfuryl alcohol	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Glucitol/glycerol blend propoxylated (containing less than 10% amines)	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Glucitol/glycerol blend propoxylated (containing 10% or more amines)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Glutaraldehyde solutions (50% or less)	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19
Glycerine	Z	S	3	2G	Open	No			Yes	O	No	AC	No	16.2.9
Glycerol monooleate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.9
Glycerol propoxylated	Z	S/P	3	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Glycerol, propoxylated and ethoxylated	Z	P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	
Glycerol/sucrose blend propoxylated and ethoxylated	Z	P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	
Glyceryl triacetate	Z	S/P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Glycidyl ester of C10 trialkylacetic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Glycine, sodium salt solution	Z	S/P	3	2G	Open	No			NF	O	No	No	No	
Glycolic acid solution (70% or less)	Z	S/P	3	2G	Cont	No	-	-	NF	C	T	No	Yes	15.12.3, 15.12.4, 15.17, 15.19, 16.2.9
Glyoxal solution (40% or less)	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9

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Glyoxylic acid solution (50% or less)	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T	ACD	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.19, 16.2.9, 16.6.1, 16.6.2, 16.6.3
Glyphosate solution (not containing surfactant)	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Grape Seed Oil	Y	S/P	2(k)	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7
Groundnut oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Heptane (all isomers)	X	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
n-Heptanoic acid	Z	S/P	3	2G	Cont	No			Yes	R	No	ABC	No	15.19.6, 15.17
Heptanol (all isomers) (d)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Heptene (all isomers)	Y	P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
Heptyl acetate	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
1-Hexadecylnaphthalene / 1,4-bis(hexadecyl)naphthalene mixture	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Hexamethylenediamine (molten)	Y	S/P	3	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Hexamethylenediamine adipate (50% in water)	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Hexamethylenediamine solution	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Hexamethylene diisocyanate	Y	S/P	2	2G	Cont	Dry	T1	IIB	Yes	C	T	AC(b)D	Yes	15.12, 15.16.2, 15.17, 15.18, 15.19
Hexamethylene glycol	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	
Hexamethyleneimine	Y	S/P	2	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19
Hexamethylenetetramine solutions	Z	S	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Hexane (all isomers)	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6

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1,6-Hexanediol, distillation overheads	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Hexanoic acid	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Hexanol	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Hexene (all isomers)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Hexyl acetate	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
Hexylene glycol	Z	S	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Hydrocarbon wax	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Hydrochloric acid (*)	Z	S/P	3	1G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19
Hydrogen peroxide solutions (over 60% but not over 70% by mass)	Y	S/P	2	2G	Cont	No			NF	R	T	No	No	15.5.1, 15.12.3, 15.12.4, 15.19.6
Hydrogen peroxide solutions (over 8% but not over 60% by mass)	Y	S/P	3	2G	Cont	No			NF	R	T	No	No	15.5.2, 15.18, 15.12.3, 15.12.4, 15.19.6
2-Hydroxyethyl acrylate	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.13, 15.17, 15.19, 16.6.1, 16.6.2
N-(Hydroxyethyl)ethylenediaminetriacetic acid, trisodium salt solution	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
2-Hydroxy-4-(methylthio)butanoic acid	Z	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Illipe oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Isoamyl alcohol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Isobutyl alcohol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Isobutyl formate	Z	P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Isobutyl methacrylate	Z	S/P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2
Isophorone	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6

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Isophoronediamine	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Isophorone diisocyanate	Y	S/P	2	2G	Cont	Dry			Yes	C	T	ABD	Yes	15.12, 15.16.2, 15.17, 15.19
Isoprene	Y	S/P	2	2G	Cont	No	T3	IIB	No	C	FT	ABC	No	15.12, 15.13, 15.14, 15.17, 15.19.6, 16.6.1, 16.6.2
Isopropanolamine	Y	S/P	3	2G	Cont	No	T2	IIA	Yes	R	No	AC	No	15.19.6, 16.2.6, 16.2.9
Isopropyl acetate	Z	P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
Isopropylamine	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12.3.2, 15.14, 15.19
Isopropylamine (70% or less) solution	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12.3.2, 15.19
Isopropylcyclohexane	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6, 16.2.9
Isopropyl ether	Y	S/P	3	2G	Cont	Inert	T2	IIA	No	R	F	AC	No	15.4.6, 15.13, 15.19.6, 16.6.1, 16.6.2
Jatropha oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7
Lactic acid	Z	S/P	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Lactonitrile solution (80% or less)	Y	S/P	1	1G	Cont	No			NF	C	T	No	Yes	15.12, 15.13, 15.17, 15.18, 15.19, 16.6.1, 16.6.2, 16.6.3
Lard	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Latex, ammonia (1% or less)- inhibited	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.9
Latex: Carboxylated styrene-Butadiene copolymer; Styrene-Butadiene rubber	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Lauric acid	X	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Ligninsulphonic acid, magnesium salt solution	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	

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Ligninsulphonic acid, sodium salt solution	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Linseed oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Liquid chemical wastes	X	S/P	2	2G	Cont	No			No	C	FT	AC	No	15.12, 15.17, 15.19, 20.5.1, 20.7
Long-chain alkaryl polyether (C11-C20)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Long-chain alkaryl sulphonic acid (C16-C60)	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Long-chain alkylphenate/Phenol sulphide mixture	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Long-chain alkylphenol (C14-C18)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Long-chain alkylphenol (C18-C30)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
L-Lysine solution (60% or less)	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Magnesium chloride solution	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Magnesium hydroxide slurry	Z	S	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Magnesium long-chain alkaryl sulphonate (C11-C50)	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Magnesium long-chain alkyl salicylate (C11+)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Maleic anhydride	Y	S/P	3	2G	Cont	No			Yes	C	T	AC(f)	Yes	15.12, 15.17, 15.19, 16.2.9

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Maleic anhydride-sodium allylsulphonate copolymer solution	Z	P	3	2G	Open	No			Yes	O	No	ABC	No	
Mango kernel oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Mercaptobenzothiazol, sodium salt solution	X	S/P	2	2G	Open	No			NF	O	No	No	No	15.19.6, 16.2.9
Mesityl oxide	Z	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Metam sodium solution	X	S/P	2	2G	Cont	No	-	-	NF	C	T	No	No	15.12.3, 15.12.4, 15.19
Methacrylic acid	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.13, 15.12.3, 15.12.4, 15.19, 16.2.9, 16.6.1
Methacrylic acid - alkoxy poly (alkylene oxide) methacrylate copolymer, sodium salt aqueous solution (45% or less)	Z	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Methacrylic resin in ethylene dichloride	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19, 16.2.9
Methacrylonitrile	Y	S/P	2	2G	Cont	No	T1	IIA	No	C	FT	AC	Yes	15.12, 15.13, 15.17, 15.19
3-Methoxy-1-butanol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6
3-Methoxybutyl acetate	Y	S/P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6
N-(2-Methoxy-1-methyl ethyl)-2-ethyl-6-methyl chloroacetanilide	X	S/P	1	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19, 16.2.6
Methyl acetate	Z	P	3	2G	Cont	No	T1	IIA	No	R	F	AC	No	15.19.6
Methyl acetoacetate	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Methyl acrylate	Y	S/P	3	2G	Cont	No	T1	IIB	No	C	FT	AC	No	15.12, 15.17, 15.13, 15.19
Methyl alcohol (*)	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	AC	No	15.12.1, 15.12.2, 15.12.3.2, 15.12.3.3, 15.12.4, 15.17, 15.19

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Methylamine solutions (42% or less)	Y	S/P	2	2G	Cont	No	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19
Methylamyl acetate	Y	P	2	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Methylamyl alcohol	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Methyl amyl ketone	Z	S/P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
N-Methylaniline	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
alpha-Methylbenzyl alcohol with acetophenone (15% or less)	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Methylbutenol	Y	S/P	3	2G	Cont	No	T4	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Methyl tert-butyl ether	Z	P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
Methyl butyl ketone	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Methylbutynol	Z	S/P	3	2G	Cont	No	T4	IIB	No	R	F	AC	No	15.19.6
Methyl butyrate	Y	S/P	3	2G	Cont	No	T4	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Methylcyclohexane	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Methylcyclopentadiene dimer	Y	S/P	2	2G	Cont	No	T4	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Methylcyclopentadienyl manganese tricarbonyl	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.18, 15.19, 16.2.9
Methyl diethanolamine	Y	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
2-Methyl-6-ethyl aniline	Y	S/P	3	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Methyl ethyl ketone	Z	S/P	3	2G	Cont	No	T1	IIA	No	R	F	AC	No	15.19.6

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2-Methyl-5-ethyl pyridine	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Methyl formate	Z	S/P	2	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.14, 15.19.6
2-Methylglutaronitrile with 2-Ethylsuccinonitrile (12% or less)	Z	S/P	3	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
2-Methyl-2-hydroxy-3-butyne	Z	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6, 16.2.9
Methyl isobutyl ketone	Z	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Methyl methacrylate	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.13, 15.19.6
3-Methyl-3-methoxybutanol	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Methyl naphthalene (molten)	X	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
N-Methylglucamine solution (70% or less)	Z	S	3	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
2-Methyl-1,3-propanediol	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
2-Methylpyridine	Z	S/P	3	2G	Cont	No	T1	IIA	No	C	F	AC	No	15.12.3.2, 15.19
3-Methylpyridine	Z	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19
4-Methylpyridine	Z	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19, 16.2.9
N-Methyl-2-pyrrolidone	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Methyl propyl ketone	Z	S	3	2G	Cont	No	T1	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Methyl salicylate	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
alpha-Methylstyrene	Y	S/P	2	2G	Cont	No	T1	IIB	No	C	FT	AD(j)	No	15.12, 15.13, 15.17, 15.19.6, 16.6.1, 16.6.2
3-(methylthio)propionaldehyde	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12, 15.17, 15.19.6

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Molybdenum polysulfide long chain alkyl dithiocarbamide complex	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Morpholine	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12.3, 15.12.4, 15.19
Motor fuel anti-knock compound (containing lead alkyls)	X	S/P	1	1G	Cont	Inert	T4	IIA	No	C	FT	AC	Yes	15.6, 15.12, 15.17, 15.18, 15.19
Myrcene	X	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Naphthalene (molten)	X	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.9
Naphthalene crude (molten)	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Naphthalenesulphonic acid-Formaldehyde copolymer, sodium salt solution	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Neodecanoic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Nitrating acid (mixture of sulphuric and nitric acids)	Y	S/P	1	1G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.16.2, 15.17, 15.18, 15.19
Nitric acid (70% and over)	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.16.2, 15.17, 15.19
Nitric acid (less than 70%)	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.17, 15.19
Nitilotriacetic acid, trisodium salt solution	Y	S/P	3	2G	Cont	No			Yes	C	T	AC	No	15.12, 15.17, 15.19.6
Nitrobenzene	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19, 16.2.9
Nitroethane	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	ABC(f)	No	15.12.3, 15.12.4, 15.19.6, 16.6.1, 16.6.2, 16.6.4

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Nitroethane(80%)/ Nitropropane(20%)	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	ABC(f)	No	15.12.3, 15.12.4, 15.19.6, 16.6.1, 16.6.2, 16.6.3
Nitroethane, 1-Nitropropane (each 15% or more) mixture	Y	S/P	3	2G	Cont	No	T2	IIB	No	R	FT	ABC(f)	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.6.1, 16.6.2, 16.6.3
o-Nitrophenol (molten)	Y	S/P	2	2G	Cont	No	T4	IIB	No	R	F	ABC	No	15.19.6, 16.2.6, 16.2.9
1- or 2-Nitropropane	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12, 15.17, 15.19
Nitropropane (60%)/Nitroethane (40%) mixture	Y	S/P	2	2G	Cont	No	T2	IIB	No	C	FT	ABC(f)	No	15.12, 15.17, 15.19.6
o- or p-Nitrotoluenes	Y	S/P	2	2G	Cont	No		IIB	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Nonane (all isomers)	X	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
Nonanoic acid (all isomers)	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Non-edible industrial grade palm oil	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.7, 16.2.9
Nonene (all isomers)	Y	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Nonyl alcohol (all isomers)	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Nonyl methacrylate monomer	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Nonylphenol	X	S/P	1	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Nonylphenol poly(4+)ethoxylate	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6
Noxious liquid, NF, (1) n.o.s. (trade name, contains) ST1, Cat. X	X	P	1	2G	Open	No	-	-	Yes	O	No	AC	No	15.19, 16.2.6

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Noxious liquid, F, (2) n.o.s. (trade name, contains) ST1, Cat. X	X	P	1	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19, 16.2.6
Noxious liquid, NF, (3) n.o.s. (trade name, contains) ST2, Cat. X	X	P	2	2G	Open	No	-		Yes	O	No	AC	No	15.19, 16.2.6
Noxious liquid, F, (4) n.o.s. (trade name, contains) ST2, Cat. X	X	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19, 16.2.6
Noxious liquid, NF, (5) n.o.s. (trade name, contains) ST2, Cat. Y	Y	P	2	2G	Open	No	-		Yes	O	No	AC	No	15.19, 16.2.6, 16.2.9(l)
Noxious liquid, F, (6) n.o.s. (trade name, contains) ST2, Cat. Y	Y	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19, 16.2.6, 16.2.9(l)
Noxious liquid, NF, (7) n.o.s. (trade name, contains) ST3, Cat. Y	Y	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	15.19, 16.2.6, 16.2.9(l)
Noxious liquid, F, (8) n.o.s. (trade name, contains) ST3, Cat. Y	Y	P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19, 16.2.6, 16.2.9(l)
Noxious liquid, NF, (9) n.o.s. (trade name, contains) ST3, Cat. Z	Z	P	3	2G	Open	No	-		Yes	O	No	AC	No	
Noxious liquid, F, (10) n.o.s. (trade name, contains) ST3, Cat. Z	Z	P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Octamethylcyclotetrasiloxane	Y	P	2	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.19.6, 16.2.9

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Octane (all isomers)	X	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Octanoic acid (all isomers)	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Octanol (all isomers)	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Octene (all isomers)	Y	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
n-Octyl acetate	Y	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Octyl aldehydes	Y	S/P	2	2G	Cont	No	T4	IIB	No	R	F	AC	No	15.19.6, 16.2.9
Octyl decyl adipate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.9
n-Octyl mercaptan	X	S/P	1	2G	Open	No			Yes	O	No	ABC	No	15.19
Offshore contaminated bulk liquid P (o)	X	P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6
Offshore contaminated bulk liquid S (o)	X	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	AC	Yes	15.12, 15.15, 15.17, 15.19
Olefin-Alkyl ester copolymer (molecular weight 2000+)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Olefin Mixture (C7-C9) C8 rich, stabilised	X	P	2	2G	Cont	No	T3	IIB	No	R	F	ABC	No	15.13, 15.19.6
Olefin mixtures (C5-C7)	Y	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Olefin mixtures (C5-C15)	X	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Olefins (C13+, all isomers)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
alpha-Olefins (C6-C18) mixtures	X	S/P	2	2G	Cont	No	T4	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Oleic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Oleum	Y	S/P	2	2G	Cont	Dry	-	-	NF	C	T	No	Yes	15.11.2 to 15.11.8, 15.12, 15.16.2, 15.17, 15.19, 16.2.6
Oleylamine	X	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9

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Olive oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Oxygenated aliphatic hydrocarbon mixture	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	
Palm acid oil	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm fatty acid distillate	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm kernel acid oil	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm kernel fatty acid distillate	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm kernel oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm kernel olein	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm kernel stearin	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm mid-fraction	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm oil fatty acid methyl ester	Y	P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.9
Palm olein	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Palm stearin	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Paraffin wax, highly-refined	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Paraffin wax, semi-refined	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6, 16.2.9
Paraldehyde	Z	S/P	3	2G	Cont	No	T3	IIB	No	R	F	AC	No	15.19.6, 16.2.9

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Paraldehyde-ammonia reaction product	Y	S/P	2	2G	Cont	No	T1	IIB	No	C	FT	ABC	Yes	15.12, 15.17, 15.19
Pentachloroethane	Y	S/P	2	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19.6
1,3-Pentadiene	Y	P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.13, 15.19.6, 16.6.1, 16.6.2, 16.6.3
1,3-Pentadiene (greater than 50%), cyclopentene and isomers, mixtures	Y	S/P	2	2G	Cont	Inert	T3	IIB	No	C	FT	ABC	Yes	15.12, 15.13, 15.17, 15.19
Pentaethylenhexamine	X	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Pentane (all isomers)	Y	P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	15.14, 15.19.6
Pentanoic acid	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
n-Pentanoic acid (64%)/2-Methyl butyric acid (36%) mixture	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.19
Pentene (all isomers)	Y	P	2	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.14, 15.19.6
n-Pentyl propionate	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Perchloroethylene	Y	S/P	2	2G	Cont	No			NF	C	T	No	No	15.12, 15.17, 15.19.6
Phenol	Y	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
1-Phenyl-1-xylyl ethane	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Phosphate esters, alkyl (C12-C14) amine	Y	S/P	2	2G	Cont	No	T4	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Phosphoric acid	Z	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.11.1, 15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.19, 16.2.9

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Phosphorus, yellow or white (*)	X	S/P	1	1G	Cont	Pad+(vent or inert)			No(c)	C	No	ABC	No	15.7, 15.19, 16.2.9
Phthalic anhydride (molten)	Y	S/P	2	2G	Cont	No	T1	IIA	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
alpha-Pinene	X	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
beta-Pinene	X	S/P	2	2G	Cont	No	T1	IIB	No	R	F	ABC	No	15.19.6
Pine oil	X	S/P	2	2G	Open	No			Yes	O		ABC	No	15.19.6, 16.2.6, 16.2.9
Piperazine, 68% solution	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Polyacrylic acid solution (40% or less)	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Polyalkyl (C18-C22) acrylate in xylene	Y	S/P	2	2G	Cont	No	T1	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Polyalkylalkenaminesuccinimide, molybdenum oxysulphide	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Poly(2-8)alkylene glycol monoalkyl(C1-C6) ether	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Poly(2-8)alkylene glycol monoalkyl (C1-C6) ether acetate	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Polyalkyl (C10-C20) methacrylate	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyalkyl (C10-C18) methacrylate/ethylene-propylene copolymer mixture	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyaluminium chloride solution	Z	S	3	2G	Open	No			NF	O	No	No	No	
Polybutene	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Polybutenyl succinimide	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Poly(2+)cyclic aromatics	X	S/P	1	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19, 16.2.6, 16.2.9

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Polyether (molecular weight 1350+)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Polyethylene glycol	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Polyethylene glycol dimethyl ether	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	
Poly(ethylene glycol) methylbutenyl ether (MW>1000)	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Polyethylene polyamines	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.6, 16.2.9
Polyethylene polyamines (more than 50% C5 -C20 paraffin oil)	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Polyferric sulphate solution	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19
Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less)	Z	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Polyisobutenamine in aliphatic (C10-C14) solvent	Y	S/P	2	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
(Polyisobutene) amino products in aliphatic hydrocarbons	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Polyisobutenyl anhydride adduct	Z	S/P	3	2G	Open	No			Yes	O	No	ABC	No	
Poly(4+)isobutylene (MW>224)	X	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyisobutylene (MW≤224)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9

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Polyglycerin, sodium salt solution (containing less than 3% sodium hydroxide)	Z	S	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19. 16.2.9
Polymethylene polyphenyl isocyanate	Y	S/P	3	2G	Cont	Dry			Yes(a)	C	T(a)	AD	Yes	15.12, 15.16.2, 15.17, 15.19.6, 16.2.9
Polyolefin (molecular weight 300+)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefin amide alkeneamine (C17+)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Polyolefin amide alkeneamine borate (C28-C250)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefin amide alkeneamine polyol	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefinamine (C28-C250)	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Polyolefinamine in alkyl (C2-C4) benzenes	Y	S/P	2	2G	Cont	No	T2	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Polyolefinamine in aromatic solvent	Y	S/P	2	2G	Cont	No	T2	IIB	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Polyolefin aminoester salts (molecular weight 2000+)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefin anhydride	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Polyolefin ester (C28-C250)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefin phenolic amine (C28-C250)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Polyolefin phosphorusulphide, barium derivative (C28-C250)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9

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Poly(20)oxyethylene sorbitan monooleate	Y	P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.9
Poly(5+)propylene	Y	P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.9
Polypropylene glycol	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Polysiloxane	Y	P	2	2G	Cont	No	T2	IIB	No	R	F	ABC	No	15.19.6, 16.2.9
Potassium chloride solution	Z	P	3	2G	Open	No	-	-	NF	O	No	No	No	16.2.9
Potassium hydroxide solution (*)	Y	S/P	3	2G	Cont	No			NF	C	No	No	Yes	15.12.3.2, 15.17, 15.19
Potassium formate solutions (*)	Z	S	3	2G	Cont	No			NF	R	No	No	No	15.19.6
Potassium oleate	Y	S/P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.9
Potassium thiosulphate (50% or less)	Y	S/P	3	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
n-Propanolamine	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
2-Propene-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer solution	Y	P	3	2G	Open	No	-	-	NF	O	No	No	No	15.19.6
beta-Propiolactone	Y	S/P	1	2G	Cont	No		IIA	Yes	C	T	AC	Yes	15.12, 15.17, 15.18, 15.19
Propionaldehyde	Y	S/P	3	2G	Cont	Inert	T4	IIB	No	R	F	AC	No	15.19.6
Propionic acid	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	AC	Yes	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12, 15.17, 15.19
Propionic anhydride	Y	S/P	2	2G	Cont	No	T2	IIA	Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Propionitrile	Y	S/P	1	1G	Cont	No	T1	IIB	No	C	FT	AC	Yes	15.12, 15.17, 15.18, 15.19
n-Propyl acetate	Y	P	3	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
n-Propyl alcohol	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
n-Propylamine	Z	S/P	2	2G	Cont	Inert	T2	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19

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Propylbenzene (all isomers)	Y	P	3	2G	Cont	No	T2	IIA	No	R	F	ABC	No	15.19.6
Propylene carbonate	Z	S	3	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19
Propylene glycol methyl ether acetate	Z	P	3	2G	Cont	No	T2	IIA	No	R	F	AC	No	
Propylene glycol monoalkyl ether	Z	S/P	3	2G	Cont	No	T3	IIA	No	R	F	AC	No	15.19.6
Propylene glycol phenyl ether	Z	S/P	3	2G	Open	No			Yes	O	No	ABC	No	
Propylene oxide	Y	S/P	2	2G	Cont	Inert	T2	IIB	No	C	FT	AC	No	15.8, 15.12, 15.14, 15.17, 15.19
Propylene tetramer	X	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
Propylene trimer	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	F	ABC	No	15.19.6
Pyridine	Y	S/P	3	2G	Cont	No	T1	IIA	No	R	FT	AC	No	15.12.3, 15.12.4, 15.19.6
Pyrolysis gasoline (containing benzene)	Y	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Rapeseed oil	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Rapeseed oil (low erucic acid containing less than 4% free fatty acids)	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Rape seed oil fatty acid methyl esters	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Resin oil, distilled	Y	S/P	2	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Rice bran oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Rosin	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Safflower oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Shea butter	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Sodium alkyl (C14-C17) sulphonates (60-65% solution)	Y	S/P	2	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9

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Sodium aluminosilicate slurry	Z	P	3	2G	Open	No			NF	O	No	No	No	16.2.9
Sodium benzoate	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	16.2.9
Sodium borohydride (15% or less)/Sodium hydroxide solution (*)	Y	S/P	3	2G	Cont	No			NF	C	No	No	Yes	15.17, 15.19, 16.2.6, 16.2.9
Sodium bromide solution (less than 50%) (*)	Y	S/P	3	2G	Open	No	-	-	NF	R	No	No	No	15.19.6
Sodium carbonate solution (*)	Z	S/P	3	2G	Open	No			NF	R	No	No	No	15.19.6
Sodium chlorate solution (50% or less) (*)	Z	S/P	3	2G	Open	No			NF	R	No	No	No	15.9, 15.12, 15.17, 15.19, 16.2.9
Sodium dichromate solution (70% or less)	Y	S/P	1	1G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.18, 15.19
Sodium hydrogen sulphide (6% or less)/Sodium carbonate (3% or less) solution	Z	S/P	3	2G	Open	No			NF	O	No	No	No	15.19.6, 16.2.9
Sodium hydrogen sulphite solution (45% or less)	Z	P	3	2G	Open	No			NF	O	No	No	No	16.2.9
Sodium hydrosulphide/Ammonium sulphide solution (*)	Y	S/P	2	2G	Cont	No	T4	IIB	No	C	FT	AC	Yes	15.12, 15.15, 15.17, 15.19, 16.6.1, 16.6.2, 16.6.3
Sodium hydrosulphide solution (45% or less) (*)	Z	S/P	3	2G	Cont	Vent or pad (gas)			NF	R	T	No	Yes	15.12, 15.15, 15.19.6, 16.2.9
Sodium hydroxide solution (*)	Y	S/P	3	2G	Cont	No			NF	C	No	No	Yes	15.17, 15.19, 16.2.6, 16.2.9
Sodium hypochlorite solution (15% or less)	Y	S/P	2	2G	Cont	No	-	-	NF	R	No	No	No	15.17, 15.19.6
Sodium methylate 21-30% in methyl alcohol	Y	S/P	2	2G	Cont	No	T1	IIA	No	C	FT	AC	Yes	15.12, 15.17, 15.19, 16.2.6 (only if >28%), 16.2.9
Sodium nitrite solution	Y	S/P	3	2G	Cont	No			NF	C	T	No	No	15.12.3, 15.12.4, 15.19, 16.2.6, 16.2.9
Sodium petroleum sulphonate	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	Yes	15.12.3, 15.12.4, 15.19.6, 16.2.6

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Sodium poly(4+)acrylate solutions	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	AC	No	16.2.9
Sodium silicate solution	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.9
Sodium sulphate solutions	Z	S	3	2G	Open	No			NF	O	No	No	No	16.2.9,
Sodium sulphide solution (15% or less)	Y	S/P	3	2G	Cont	No			NF	C	T	No	Yes	15.12, 15.17, 15.19, 16.2.9
Sodium sulphite solution (25% or less)	Y	S/P	3	2G	Open	No			NF	O	No	No	No	15.19.6, 16.2.9
Sodium thiocyanate solution (56% or less)	Y	S/P	3	2G	Open	No			NF	O	No	No	No	15.19.6, 16.2.9
Soyabean oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Soybean Oil Fatty Acid Methyl Ester	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Styrene monomer	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.13, 15.17, 15.19.6, 16.6.1, 16.6.2
Sulphohydrocarbon (C3-C88)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Sulpholane	Y	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Sulphur (molten) (*)	Z	S/P	3	1G	Cont	Vent or pad (gas)	T3		Yes	R	F	No	No	15.10, 16.2.9
Sulphuric acid	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.16.2, 15.17, 15.19, 16.2.9
Sulphuric acid, spent	Y	S/P	2	2G	Cont	No			NF	C	T	No	Yes	15.11, 15.12, 15.16.2, 15.17, 15.19
Sulphurized fat (C14-C20)	Z	S/P	3	2G	Open	No			Yes	O	No	ABC	No	
Sulphurized polyolefinamide alkene (C28-C250) amine	Z	P	3	2G	Open	No	-	-	Yes	O	No	AC	No	
Sunflower seed oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Tall oil, crude	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6

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Tall oil, distilled	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6
Tall oil fatty acid (resin acids less than 20%)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6
Tall oil pitch	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6,16.2.6, 16.2.9
Tall oil soap, crude	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.6
Tallow	Y	P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Tallow fatty acid	Y	P	2	2G	Open	No	-	-	Yes	O	No	AC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Tetrachloroethane	Y	S/P	2	2G	Cont	No			NF	R	T	No	No	15.12.3, 15.12.4, 15.19
Tetraethylene glycol	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Tetraethylene pentamine	Y	S/P	2	2G	Cont	No			Yes	C	T	AC	Yes	15.12, 15.17, 15.19
Tetrahydrofuran	Z	S	3	2G	Cont	No	T3	IIB	No	R	F	AC	No	15.19.6
Tetrahydronaphthalene	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Tetramethylbenzene (all isomers)	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.9
Titanium dioxide slurry	Z	P	3	2G	Open	No			NF	O	No	No	No	
Toluene	Y	S/P	3	2G	Cont	No	T1	IIA	No	C	FT	AC	No	15.12, 15.17, 15.19.6
Toluenediamine	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.17, 15.18, 15.19, 16.2.6, 16.2.9
Toluene diisocyanate	Y	S/P	2	2G	Cont	Dry	-	-	Yes	C	T	ABC(b)D	Yes	15.12, 15.16.2, 15.17, 15.18, 15.19, 16.2.9
o-Toluidine	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19
Tributyl phosphate	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	No	15.12.3, 15.12.4, 15.19.6
1,2,3-Trichlorobenzene (molten)	X	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9

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1,2,4-Trichlorobenzene	X	S/P	1	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19, 16.2.9
1,1,1-Trichloroethane	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
1,1,2-Trichloroethane	Y	S/P	3	2G	Open	No			NF	O	No	No	No	15.19.6
Trichloroethylene	Y	S/P	2	2G	Cont	No	-	-	NF	C	T	No	No	15.12, 15.17, 15.19.6
1,2,3-Trichloropropane	Y	S/P	3	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19
1,1,2-Trichloro-1,2,2-Trifluoroethane	Y	P	2	2G	Open	No			NF	O	No	No	No	15.19.6
Tricresyl phosphate (containing 1% or more ortho-isomer)	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19, 16.2.6
Tricresyl phosphate (containing less than 1% ortho-isomer)	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6
Tridecane	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Tridecanoic acid	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Tridecyl acetate	Y	S/P	3	2G	Cont	No	-	-	Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Triethanolamine	Z	S/P	3	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Triethylamine	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	ABC	No	15.12.3, 15.12.4, 15.19
Triethylbenzene	X	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6
Triethylenetetramine	Y	S/P	2	2G	Cont	No	-	-	Yes	C	T	AC	Yes	15.12, 15.17, 15.19, 16.2.9
Triethyl phosphate	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6
Triethyl phosphite	Z	S/P	3	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Triisopropanolamine	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.9
Triisopropylated phenyl phosphates	X	P	2	2G	Open	No			Yes	O	No	AC	No	15.19.6, 16.2.6

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Trimethylacetic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.11, 15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
Trimethylamine solution (30% or less)	Z	S/P	2	2G	Cont	No	T3	IIB	No	R	FT	AC	No	15.12.3, 15.12.4, 15.14, 15.19.6
Trimethylbenzene (all isomers)	X	S/P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6
Trimethylol propane propoxylated	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	ABC	No	
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	Y	S/P	3	2G	Open	No			Yes	O	No	ABC	No	15.19.6
2,2,4-Trimethyl-1,3-pentanediol-1-isobutyrate	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
1,3,5-Trioxane	Y	S/P	3	2G	Cont	No	T2	IIB	No	C	FT	AC	No	15.12, 15.17, 15.19.6, 16.2.9
Tripropylene glycol	Z	P	3	2G	Open	No			Yes	O	No	AC	No	
Trixylyl phosphate	X	S/P	1	2G	Cont	No			Yes	C	T	ABC	No	15.12, 15.17, 15.19.6, 16.2.6
Tung oil	Y	S/P	2(k)	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Turpentine	X	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	AC	No	15.19.6
Undecanoic acid	Y	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
1-Undecene	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6
Undecyl alcohol	X	S/P	2	2G	Cont	No			Yes	R	T	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Urea/Ammonium nitrate solution	Y	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	15.19.6

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Urea/Ammonium phosphate solution	Y	S/P	2	2G	Cont	No			Yes	R	T	AC	No	15.12.3, 15.12.4, 15.19.6
Urea solution	Z	S/P	3	2G	Open	No			Yes	O	No	AC	No	16.2.9,
Used cooking oil (m)	X	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Used cooking oil (Triglycerides, C16-C18 and C18 unsaturated) (m) (n)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Valeraldehyde (all isomers)	Y	S/P	3	2G	Cont	Inert	T3	IIB	No	R	F	ABC	No	15.4.6, 15.13, 15.19.6, 16.6.1, 16.6.2
Vegetable acid oils (m)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Vegetable fatty acid distillates (m)	Y	P	2	2G	Open	No	-	-	Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Vegetable oil mixtures, containing less than 15% free fatty acid (m)	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.7, 16.2.9
Vinyl acetate	Y	S/P	3	2G	Cont	No	T2	IIA	No	C	FT	ABC	No	15.12, 15.13, 15.17, 15.19.6, 16.6.1, 16.6.2
Vinyl ethyl ether	Z	S/P	2	2G	Cont	Inert	T3	IIB	No	R	F	ABC	No	15.4, 15.13, 15.14, 15.19.6, 16.6.1, 16.6.2
Vinylidene chloride	Y	S/P	2	2G	Cont	Inert	T2	IIA	No	C	FT	ABC	No	15.12, 15.13, 15.14, 15.17, 15.19, 16.6.1, 16.6.2
Vinyl neodecanoate	Y	S/P	2	2G	Cont	No			Yes	C	T	ABC	Yes	15.12, 15.13, 15.17, 15.19, 16.6.1, 16.6.2
Vinyltoluene	Y	S/P	2	2G	Cont	No	T1	IIA	No	C	FT	ABC	No	15.12, 15.13, 15.17, 15.19.6, 16.6.1, 16.6.2
White spirit, low (15-20%) aromatic	Y	S/P	2	2G	Cont	No	T3	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6, 16.2.9
Wood lignin with sodium acetate/oxalate	Z	S/P	3	2G	Open	No	-	-	NF	O	No	No	No	
Xylenes	Y	P	2	2G	Cont	No	T1	IIA	No	R	F	ABC	No	15.19.6, 16.2.9 (h)

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Xylenes/ethylbenzene (10% or more) mixture	Y	S/P	2	2G	Cont	No	T2	IIA	No	R	FT	ABC	No	15.12.3, 15.12.4, 15.19.6
Xylenol	Y	S/P	2	2G	Cont	No	-	IIA	Yes	C	T	ABC	Yes	15.12, 15.17, 15.19, 16.2.9
Zinc alkaryl dithiophosphate (C7-C16)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6, 16.2.9
Zinc alkenyl carboxamide	Y	S/P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6
Zinc alkyl dithiophosphate (C3-C14)	Y	P	2	2G	Open	No			Yes	O	No	ABC	No	15.19.6, 16.2.6

Footnotes to products in chapter 17

Some entries in chapter 17 contain footnotes, as either letters or symbols in parentheses following the name of the product, in *column a* of the tables. These provide additional information about the carriage requirements for the product. The definitions of these footnotes are included below.

- a If the product to be carried contains flammable solvents such that the flashpoint does not exceed 60°C, then special electrical systems and a flammable-vapour detector shall be provided.
- b Although water is suitable for extinguishing open-air fires involving chemicals to which this footnote applies, water shall not be allowed to contaminate closed tanks containing these chemicals because of the risk of hazardous gas generation.
- c Phosphorus, yellow or white, is carried above its autoignition temperature and therefore flashpoint is not appropriate. Electrical equipment requirements may be similar to those for substances with a flashpoint above 60°C.
- d 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.
- e Applies to n-decyl alcohol only.
- f Dry chemical shall not be used as fire extinguishing media.
- g Confined spaces shall be tested for both formic acid vapours and carbon monoxide gas, a decomposition product.
- h Applies to p-xylene only.
- i For mixtures containing no other components with safety hazards and where the pollution category is Y or less.
- j Only certain alcohol-resistant foams are effective.
- k Requirements for Ship Type identified in *column e* might be subject to regulation 4.1.3 of Annex II of MARPOL.
- l Applicable when the melting point is equal to or greater than 0°C.
- m From vegetable oils, animal fats and fish oils specified in the IBC Code.
- n Confirmation that the product is composed of Triglycerides, C16-C18 and C18 unsaturated shall be required in order for the entry to be used. Otherwise, the more generic entry "Used cooking oil (m)" must be used.
- o Indicates that the entries are to be used solely for backloading of contaminated bulk liquids from offshore installations used in the search and exploitation of seabed mineral resources.
- * Indicates that with reference to chapter 21 of the IBC Code (paragraph 21.1.3), deviations from the normal assignment criteria used for some carriage requirements have been implemented.

Chapter 18

List of products to which the Code does not apply

18.1 The following are products which have been reviewed for their safety and pollution hazards and determined not to present hazards to such an extent as to warrant application of the Code.

18.2 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 shall prescribe appropriate safety requirements.

18.3 Some liquid substances are identified as falling into Pollution Category Z and, therefore, subject to certain requirements of MARPOL Annex II.

18.4 Liquid mixtures which are assessed or provisionally assessed under regulation 6.3 of MARPOL Annex II as falling into Pollution Category Z or OS, and which do not present safety hazards, may be carried under the appropriate entry in this chapter for "Noxious or Non-Noxious Liquid Substances, not otherwise specified (n.o.s.)".

EXPLANATORY NOTES

Product name The product name shall be used in the shipping document for any cargo offered for bulk shipments. Any additional name may be included in brackets after the product name. In some cases, the product names are not identical with the names given in previous issues of the Code.

Pollution Category The letter Z means the Pollution Category assigned to each product under Annex II of MARPOL. OS means the product was evaluated and found to fall outside Categories X, Y, or Z.

Product Name	Pollution Category
Acetone	Z
Alcoholic beverages, n.o.s.	Z
Apple juice	OS
n-Butyl alcohol	Z
sec-Butyl alcohol	Z
Calcium carbonate slurry	OS
Clay slurry	OS
Coal slurry	OS
Ethyl alcohol	Z
Glucose solution	OS
Glycerol ethoxylated	OS
Hydrogenated starch hydrolysate	OS
Isopropyl alcohol	Z
Kaolin slurry	OS
Lecithin	OS
Maltitol solution	OS
Microsilica slurry	OS

Molasses	OS
Noxious liquid, (11) n.o.s. (trade name, contains) Cat. Z	Z
Non noxious liquid, (12) n.o.s. (trade name, contains) Cat. OS	OS
Orange juice (concentrated)	OS
Orange juice (not concentrated)	OS
Potassium chloride solution (less than 26%)	OS
Propylene glycol	OS
Sodium acetate solutions	Z
Sodium bicarbonate solution (less than 10%)	OS
Sorbitol solution	OS
Sulphonated polyacrylate solution	Z
Tetraethyl silicate monomer/oligomer (20% in ethanol)	Z
Triethylene glycol	OS
Vegetable protein solution (hydrolysed)	OS
Water	O

Chapter 19

Index of Products Carried in Bulk

19.1 The first column of the Index of Products Carried in Bulk (hereafter referred to as "the Index") provides the so-called Index Name. Where the Index Name is in capitals and in bold, the Index Name is identical to the Product Name in either chapter 17 or chapter 18. The second column listing the relevant Product Name is therefore empty. Where the Index Name is non-bold lower case it reflects a synonym for which the Product Name in either chapter 17 or chapter 18 is given in the second column. The relevant chapter of the IBC Code is reflected in the third column.

19.2 Following a review of chapter 19, a column listing UN numbers which was previously included had been removed from the Index. Since UN numbers are only available for a limited number of Index Names and there are inconsistencies between some of the names used in chapter 19 and those linked to UN numbers, it was decided to remove UN number references in order to avoid any confusion.

19.3 The Index has been developed for information purposes only. None of the Index Names indicated in non-bold lower case in the first column shall be used as the Product Name on the shipping document.

19.4 Prefixes forming an integral part of the name are shown in ordinary (roman) type and are taken into account in determining the alphabetical order of entries. These include such prefixes as:

Mono Di Tri Tetra Penta Iso Bis Neo Ortho Cyclo

19.5 Prefixes that are disregarded for purposes of alphabetical order include the following:

n-	(normal-)
sec-	(secondary-)
tert-	(tertiary-)
o-	(ortho-)
m-	(meta-)
p-	(para-)
N-	
O-	
S-	
sym-	(symmetrical)
uns-	(unsymmetrical)
dl-	
D-	
L-	
cis-	
trans-	
(E)-	
(Z)-	
alpha-	(α -)
beta-	(β -)
gamma-	(γ -)
epsilon-	(ϵ -)
omega-	(ω -)

19.6 The Index utilizes a note after the index name for some entries (shown as (a) or (b)) which indicates that the following qualifications apply:

- (a) this Index Name represents a subset of the corresponding Product Name.
- (b) The Product Name corresponding to this Index Name contains a carbon chain length qualification. Since the Index Name should always represent a subset or be an exact synonym of the corresponding Product Name, the carbon chain length characteristics should be checked for any product identified by this Index Name.

Index Name	Product Name	Chapter
Abietic anhydride	ROSIN	17
acedimethylamide	N,N-DIMETHYLACETAMIDE	17
Acetaldehyde cyanohydrin solution (80% or less)	LACTONITRILE SOLUTION (80% OR LESS)	17
Acetaldehyde trimer	PARALDEHYDE	17
ACETIC ACID		17
Acetic acid anhydride	ACETIC ANHYDRIDE	17
Acetic acid, ethenyl ester	VINYL ACETATE	17
Acetic acid, methyl ester	METHYL ACETATE	17
Acetic acid, vinyl ester	VINYL ACETATE	17
ACETIC ANHYDRIDE		17
Acetic ester	ETHYL ACETATE	17
Acetic ether	ETHYL ACETATE	17
Acetic oxide	ACETIC ANHYDRIDE	17
Acetoacetic acid, methyl ester	METHYL ACETOACETATE	17
Acetoacetic ester	ETHYL ACETOACETATE	17
ACETOCHLOR		17
ACETONE		18
ACETONE CYANOHYDRIN		17
ACETONITRILE		17
ACETONITRILE (LOW PURITY GRADE)		17
Acetyl anhydride	ACETIC ANHYDRIDE	17
Acetylene tetrachloride	TETRACHLOROETHANE	17
Acetyl ether	ACETIC ANHYDRIDE	17
Acetyl oxide	ACETIC ANHYDRIDE	17
ACID OIL MIXTURE FROM SOYABEAN, CORN (MAIZE) AND SUNFLOWER OIL REFINING		17
Acroleic acid	ACRYLIC ACID	17
ACRYLAMIDE SOLUTION (50% OR LESS)		17
ACRYLIC ACID		17
ACRYLIC ACID/ETHENESULPHONIC ACID COPOLYMER WITH PHOSPHONATE GROUPS, SODIUM SALT SOLUTION		17
Acrylic acid, 2-hydroxyethyl ester	2-HYDROXYETHYL ACRYLATE	17
Acrylic amide solution, 50% or less	ACRYLAMIDE SOLUTION (50% OR LESS)	17
Acrylic resin monomer	METHYL METHACRYLATE	17
ACRYLONITRILE		17
ACRYLONITRILE-STYRENE COPOLYMER DISPERSION IN POLYETHER POLYOL		17
Adipic acid, bis(2-ethylhexyl) ester	DI-(2-ETHYLHEXYL) ADIPATE	17
ADIPONITRILE		17
ALACHLOR TECHNICAL (90% OR MORE)		17
Alcohol	ETHYL ALCOHOL	18
Alcohol, C10	DECYL ALCOHOL (ALL ISOMERS)	17
Alcohol, C11	UNDECYL ALCOHOL	17
Alcohol, C12	DODECYL ALCOHOL	17
Alcohol, C7 (a)	HEPTANOL (ALL ISOMERS) (D)	17
Alcohol, C8	OCTANOL (ALL ISOMERS)	17

Index Name	Product Name	Chapter
Alcohol, C9	NONYL ALCOHOL (ALL ISOMERS)	17
ALCOHOLIC BEVERAGES, N.O.S.		18
ALCOHOL (C9-C11) POLY(2.5-9)ETHOXYLATE		17
ALCOHOL (C10-C18) POLY (7) ETHOXYLATE		17
ALCOHOL (C6-C17) (SECONDARY) POLY(3-6)ETHOXYLATES		17
ALCOHOL (C6-C17) (SECONDARY) POLY(7-12)ETHOXYLATES		17
ALCOHOL (C12-C16) POLY(1-6) ETHOXYLATES		17
ALCOHOL (C12-C16) POLY(20+)ETHOXYLATES		17
ALCOHOL (C12-C16) POLY(7-19)ETHOXYLATES		17
ALCOHOLS (C13+)		17
Alcohols, C13 - C15	ALCOHOLS (C13+)	17
ALCOHOLS (C12+), PRIMARY, LINEAR		17
ALCOHOLS (C8-C11), PRIMARY, LINEAR AND ESSENTIALLY LINEAR		17
ALCOHOLS (C12-C13), PRIMARY, LINEAR AND ESSENTIALLY LINEAR		17
ALCOHOLS (C14-C18), PRIMARY, LINEAR AND ESSENTIALLY LINEAR		17
Aldehyde collidine	2-METHYL-5-ETHYL PYRIDINE	17
Aldehydine	2-METHYL-5-ETHYL PYRIDINE	17
ALKANES (C6-C9)		17
ISO- AND CYCLO-ALKANES (C10-C11)		17
ISO- AND CYCLO-ALKANES (C12+)		17
ALKANES (C5-C7), LINEAR AND BRANCHED		17
ALKANES (C10-C17), LINEAR AND BRANCHED		17
ALKANES (C10-C26), LINEAR AND BRANCHED (FLASHPOINT ≤60°C)		17
ALKANES (C10-C26), LINEAR AND BRANCHED, (FLASHPOINT >60°C)		17
N-ALKANES (C9-C11)		17
N-ALKANES (C10-C20)		17
Alkane(C10-C18)sulfonic acid, phenyl ester (a)	ALKYL SULPHONIC ACID ESTER OF PHENOL	17
ALKARYL POLYETHERS (C9-C20)		17
ALKENOIC ACID, POLYHYDROXY ESTER BORATED		17
ALKENYL (C11+) AMIDE		17
ALKENYL (C16-C20) SUCCINIC ANHYDRIDE		17
ALKYL ACRYLATE/VINYLPYRIDINE COPOLYMER IN TOLUENE		17
ALKYL/CYCLO (C4-C5) ALCOHOLS		17
ALKYLARYL PHOSPHATE MIXTURES (MORE THAN 40% DIPHENYL TOLYL PHOSPHATE, LESS THAN 0.02% ORTHO-ISOMERS)		17
ALKYLATED (C4-C9) HINDERED PHENOLS		17
ALKYLBENZENE, ALKYLINDANE, ALKYLINDENE MIXTURE (EACH C12-C17)		17
ALKYLBENZENE DISTILLATION BOTTOMS		17

Index Name	Product Name	Chapter
ALKYLBENZENE MIXTURES (CONTAINING AT LEAST 50% OF TOLUENE)		17
ALKYL (C3-C4) BENZENES		17
ALKYL (C5-C8) BENZENES		17
ALKYL(C9+)BENZENES		17
ALKYLBENZENES MIXTURES (CONTAINING NAPHTHALENE)		17
ALKYL (C11-C17) BENZENE SULPHONIC ACID		17
ALKYLBENZENE SULPHONIC ACID, SODIUM SALT SOLUTION		17
ALKYL (C12+) DIMETHYLAMINE		17
ALKYL DITHIOCARBAMATE (C19-C35)		17
ALKYL DITHIOTHIAZOLE (C6-C24)		17
ALKYL ESTER COPOLYMER (C4-C20)		17
ALKYL (C8-C10)/(C12-C14):(40% OR LESS/60% OR MORE) POLYGLUCOSIDE SOLUTION (55% OR LESS)		17
ALKYL (C8-C10)/(C12-C14):(60% OR MORE/40% OR LESS) POLYGLUCOSIDE SOLUTION(55% OR LESS)		17
ALKYL (C7-C9) NITRATES		17
2,2'- [3-(Alkyl(C16-C18)oxy)propylimino]diethanol (a)	ETHOXYLATED LONG CHAIN (C16+) ALKYLALOXALYLAMINE	17
Alkylphenol, long-chain (C14-C18)	LONG-CHAIN ALKYLPHENOL (C14-C18)	17
Alkylphenol, long-chain (C18-C30)	LONG-CHAIN ALKYLPHENOL (C18-C30)	17
ALKYL(C7-C11)PHENOL POLY(4-12) ETHOXYLATE		17
ALKYL (C8-C40) PHENOL SULPHIDE		17
ALKYL (C8-C9) PHENYLAMINE IN AROMATIC SOLVENTS		17
ALKYL (C9-C15) PHENYL PROPOXYLATE		17
ALKYL (C8-C10) POLYGLUCOSIDE SOLUTION (65% OR LESS)		17
ALKYL (C8-C10)/(C12-C14):(50%/50%) POLYGLUCOSIDE SOLUTION (55% OR LESS)		17
ALKYL (C12-C14) POLYGLUCOSIDE SOLUTION (55% OR LESS)		17
ALKYL(C12-C16) PROPOXYAMINE ETHOXYLATE		17
ALKYL (C10-C15, C12 RICH) PHENOL POLY(4-12)ETHOXYLATE		17
ALKYL (C10-C20, SATURATED AND UNSATURATED) PHOSPHITE		17
ALKYL SULPHONIC ACID ESTER OF PHENOL		17
ALKYL (C18+) TOLUENES		17
Alkyltoluenesulfonic acid, calcium salts, high overbase (up to 70% in mineral oil)	ALKYL (C18-C28) TOLUENESULPHONIC ACID, CALCIUM SALTS, HIGH OVERBASE	17
Alkyl(C18-C28)toluenesulfonic acid,calcium salts, low overbase (up to 60% in mineral oil)	ALKYL (C18-C28) TOLUENESULPHONIC ACID, CALCIUM SALTS, LOW OVERBASE	17
ALKYL(C18-C28)TOLUENESULPHONIC ACID		17
ALKYL(C18-C28)TOLUENESULPHONIC ACID, CALCIUM SALTS, BORATED		17
ALKYL (C18-C28) TOLUENESULPHONIC ACID, CALCIUM SALTS, HIGH OVERBASE		17
ALKYL (C18-C28) TOLUENESULPHONIC ACID, CALCIUM SALTS, LOW OVERBASE		17

Index Name	Product Name	Chapter
3-Alky(C16-C18)oxy-N,N'-bis(2-hydroxyethyl)propan-1-amine (a)	ETHOXYLATED LONG CHAIN (C16+) ALKYL OXYALKYLAMINE	17
ALLYL ALCOHOL		17
ALLYL CHLORIDE		17
ALUMINIUM CHLORIDE/HYDROGEN CHLORIDE SOLUTION		17
ALUMINIUM HYDROXIDE, SODIUM HYDROXIDE, SODIUM CARBONATE SOLUTION (40% OR LESS)		17
Aluminium silicate hydroxide	KAOLIN SLURRY	18
ALUMINIUM SULPHATE SOLUTION		17
Aminoacetic acid, sodium salt solution	GLYCINE, SODIUM SALT SOLUTION	17
1-Amino-3-aminomethyl-3,5,5-trimethylcyclohexane	ISOPHORONEDIAMINE	17
Aminobenzene	ANILINE	17
1-Aminobutane (a)	BUTYLAMINE (ALL ISOMERS)	17
2-Aminobutane	BUTYLAMINE (ALL ISOMERS)	17
Aminocyclohexane	CYCLOHEXYLAMINE	17
Aminoethane	ETHYLAMINE	17
Aminoethane solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)	17
2-Aminoethanol	ETHANOLAMINE	17
2-(2-AMINOETHOXY) ETHANOL		17
2-(2-Aminoethylamino)ethanol	AMINOETHYL ETHANOLAMINE	17
AMINOETHYLDIETHANOLAMINE/AMINOETHYLETHANOLAMINE SOLUTION		17
AMINOETHYL ETHANOLAMINE		17
N-(2-aminoethyl)ethylenediamine	DIETHYLENETRIAMINE	17
1-(2-Aminoethyl)piperazine	N-AMINOETHYLPIPERAZINE	17
N-AMINOETHYLPIPERAZINE		17
2-Aminoisobutane (a)	BUTYLAMINE (ALL ISOMERS)	17
Aminomethane solutions, 42% or less	METHYLAMINE SOLUTIONS (42% OR LESS)	17
1-Amino-2-methylbenzene	O-TOLUIDINE	17
2-Amino-1-methylbenzene	O-TOLUIDINE	17
2-AMINO-2-METHYL-1-PROPANOL		17
3-Aminomethyl-3,5,5-trimethylcyclohexylamine	ISOPHORONEDIAMINE	17
Aminophen	ANILINE	17
1-Aminopropane	N-PROPYLAMINE	17
2-Aminopropane	ISOPROPYLAMINE	17
2-Aminopropane (70% or less) solution	ISOPROPYLAMINE (70% OR LESS) SOLUTION	17
1-Amino-2-propanol	ISOPROPANOLAMINE	17
1-Aminopropan-2-ol	ISOPROPANOLAMINE	17
3-Aminopropan-1-ol	N-PROPANOLAMINE	17
2-Aminotoluene	O-TOLUIDINE	17
o-Aminotoluene	O-TOLUIDINE	17
5-Amino-1,3,3-trimethylcyclohexylmethylamine	ISOPHORONEDIAMINE	17
AMMONIA AQUEOUS (28% OR LESS)		17
Ammonia water, 28% or less	AMMONIA AQUEOUS (28% OR LESS)	17
AMMONIUM CHLORIDE SOLUTION (LESS THAN 25%) (*)		17
AMMONIUM HYDROGEN PHOSPHATE SOLUTION		17

Index Name	Product Name	Chapter
Ammonium hydroxide, 28% or less	AMMONIA AQUEOUS (28% OR LESS)	17
AMMONIUM LIGNOSULPHONATE SOLUTIONS		17
AMMONIUM NITRATE SOLUTION (93% OR LESS) (*)		17
AMMONIUM POLYPHOSPHATE SOLUTION		17
AMMONIUM SULPHATE SOLUTION		17
AMMONIUM SULPHIDE SOLUTION (45% OR LESS) (*)		17
AMMONIUM THIOSULPHATE SOLUTION (60% OR LESS)		17
AMYL ACETATE (ALL ISOMERS)		17
Amyl acetate, commercial (a)	AMYL ACETATE (ALL ISOMERS)	17
n-Amyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
sec-Amyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
Amylacetic ester (a)	AMYL ACETATE (ALL ISOMERS)	17
Amyl alcohol	N-AMYL ALCOHOL	17
N-AMYL ALCOHOL		17
AMYL ALCOHOL, PRIMARY		17
SEC-AMYL ALCOHOL		17
TERT-AMYL ALCOHOL		17
Amyl aldehyde	VALERALDEHYDE (ALL ISOMERS)	17
Amylcarbinol	HEXANOL	17
Amylene hydrate	TERT-AMYL ALCOHOL	17
TERT-AMYL ETHYL ETHER		17
Amyl ethyl ketone	ETHYL AMYL KETONE	17
TERT-AMYL METHYL ETHER		17
n-Amyl methyl ketone	METHYL AMYL KETONE	17
n-Amyl propionate	N-PENTYL PROPIONATE	17
Anaesthetic ether	DIETHYL ETHER (*)	17
ANILINE		17
Aniline oil	ANILINE	17
Anilinobenzene	DIPHENYLAMINE (MOLTEN)	17
Anthracene oil (coal tar fraction) (a)	COAL TAR	17
Ant oil, artificial	FURFURAL	17
APPLE JUICE		18
Aqua fortis	NITRIC ACID (70% AND OVER)	17
Argilla	KAOLIN SLURRY	18
ARYL POLYOLEFINS (C11-C50)		17
AVIATION ALKYLATES (C8 PARAFFINS AND ISO-PARAFFINS BPT 95 - 120°C)		17
Azacycloheptane	HEXAMETHYLENEIMINE	17
3-Azapentane-1,5-diamine	DIETHYLENETRIAMINE	17
Azepane	HEXAMETHYLENEIMINE	17
Azotic acid	NITRIC ACID (70% AND OVER)	17
BARIUM LONG CHAIN (C11-C50) ALKARYL SULPHONATE		17
Basic calcium alkyl salicylate in approximately 30% mineral oil (b)	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C13+)	17
Battery acid	SULPHURIC ACID	17

Index Name	Product Name	Chapter
Behenyl alcohol (a)	ALCOHOLS (C13+)	17
Benzenamine	ANILINE	17
1,4-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	BIS(2-ETHYLHEXYL) TEREPHTHALATE	17
1,4-Benzenedicarboxylic acid, butyl ester	DIBUTYL TEREPHTHALATE	17
1,2-Benzenedicarboxylic acid, diethyl ester	DIETHYL PHTHALATE	17
1,2-Benzenedicarboxylic acid, diundecyl ester	DIUNDECYL PHTHALATE	17
BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)		17
BENZENE SULPHONYL CHLORIDE		17
BENZENESULPHONYL CHLORIDE	BENZENE SULPHONYL CHLORIDE	17
BENZENETRICARBOXYLIC ACID, TRIOCTYL ESTER		17
Benzenol	PHENOL	17
Benzol	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Benzole	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Benzophenol	PHENOL	17
2-Benzothiazolethiol, sodium salt solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	17
Benzothiazole-2-thiol, sodium salt solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	17
(2-Benzothiazolylthio) sodium solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	17
BENZYL ACETATE		17
BENZYL ALCOHOL		17
Benzyl butyl phthalate	BUTYL BENZYL PHTHALATE	17
BENZYL CHLORIDE		17
Betaprone	BETA-PROPIOLACTONE	17
Betula oil	METHYL SALICYLATE	17
Biformyl	GLYOXAL SOLUTION (40% OR LESS)	17
BIO-FUEL BLENDS OF DIESEL/GAS OIL AND ALKANES (C10-C26), LINEAR AND BRANCHED WITH A FLASHPOINT >60°C (>25% BUT <99% BY VOLUME)		17
BIO-FUEL BLENDS OF DIESEL/GAS OIL AND ALKANES (C10-C26), LINEAR AND BRANCHED WITH A FLASHPOINT ≤ 60°C (>25% BUT <99% BY VOLUME)		17
BIO-FUEL BLENDS OF DIESEL/GAS OIL AND FAME (>25% BUT <99% BY VOLUME)		17
BIO-FUEL BLENDS OF DIESEL/GAS OIL AND VEGETABLE OIL (>25% BUT <99% BY VOLUME)		17
BIO-FUEL BLENDS OF GASOLINE AND ETHYL ALCOHOL (>25% BUT <99% BY VOLUME)		17
BIO-FUEL BLENDS OF JET FUELS AND ALKANES (C10-C17), LINEAR AND BRANCHED (>25% BUT <99% BY VOLUME)		17
Biphenyl	DIPHENYL	17
Bis(methylcyclopentadiene)	METHYLCYCLOPENTADIENE DIMER	17
2,5-Bis(alkyl(C7+)thio)-1,3,4-thiadiazole	ALKYL DITHIOTHIAZADIAZOLE (C6-C24)	17
Bis(2-aminoethyl)amine	DIETHYLENETRIAMINE	17
N,N'-Bis(2-aminoethyl)ethane-1,2-diamine	TRIETHYLENETETRAMINE	17
N,N'-Bis(2-aminoethyl)ethylenediamine	TRIETHYLENETETRAMINE	17
N,N-Bis(2-(bis(carboxymethyl)amino)ethyl)glycine, pentasodium salt solution	DIETHYLENETRIAMINEPENTAACETIC ACID, PENTASODIUM SALT SOLUTION	17

Index Name	Product Name	Chapter
Bis(2-butoxyethyl) ether	DIETHYLENE GLYCOL DIBUTYL ETHER	17
N,N- Bis(carboxymethyl)glycine trisodium salt solution	NITRILOTRIACETIC ACID, TRISODIUM SALT SOLUTION	17
Bis(chloroethyl) ether	DICHLOROETHYL ETHER	17
Bis(2-chloroethyl) ether	DICHLOROETHYL ETHER	17
Bis (2-chloroisopropyl) ether	2,2'-DICHLOROISOPROPYL ETHER	17
Bis(2-chloro-1-methylethyl) ether	2,2'-DICHLOROISOPROPYL ETHER	17
Bis[2-(2,3-epoxypropoxy)phenyl]methane	DIGLYCIDYL ETHER OF BISPHENOL F	17
2,2-Bis[4-(2,3-epoxypropoxy)phenyl]propane	DIGLYCIDYL ETHER OF BISPHENOL A	17
Bis(2-ethoxyethyl) ether	DIETHYLENE GLYCOL DIETHYL ETHER	17
Bis(2-ethylhexyl) adipate	DI-(2-ETHYLHEXYL) ADIPATE	17
Bis (2-ethylhexyl)-1-4-benzenedicarboxylate	BIS(2-ETHYLHEXYL) TEREPHTHALATE	17
Bis(2-ethylhexyl) hydrogen phosphate	DI-(2-ETHYLHEXYL) PHOSPHORIC ACID	17
Bis(2-ethylhexyl) phthalate	DIOCTYL PHTHALATE	17
BIS(2-ETHYLHEXYL) TEREPHTHALATE		17
Bis(2-hydroxyethyl)amine	DIETHANOLAMINE	17
Bis(2-hydroxyethyl)ammonium 2,4-dichlorophenoxyacetate solution	2,4-DICHLOROPHENOXYACETIC ACID, DIETHANOLAMINE SALT SOLUTION	17
Bis(2-hydroxyethyl) ether	DIETHYLENE GLYCOL	17
Bis(2-hydroxypropyl)amine	DIISOPROPANOLAMINE	17
Bis(6-methylheptyl) phthalate	DIOCTYL PHTHALATE	17
Blackstrap molasses (a)	MOLASSES	18
Blend of propoxylated polyether polyols with >10% additives	GLUCITOL/GLYCEROL BLEND PROPOXYLATED (CONTAINING 10% OR MORE AMINES)	17
Bolus alba	KAOLIN SLURRY	18
BRAKE FLUID BASE MIX: POLY(2-8)ALKYLENE (C2-C3) GLYCOLS/POLYALKYLENE (C2-C10) GLYCOLS MONOALKYL (C1-C4) ETHERS AND THEIR BORATE ESTERS		17
Bran oil	FURFURAL	17
BROMOCHLOROMETHANE		17
Butaldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
Butanal (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
n-Butanal (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
1,3-Butanediol (a)	BUTYLENE GLYCOL	17
Butane-1,3-diol (a)	BUTYLENE GLYCOL	17
1,4-Butanediol (a)	BUTYLENE GLYCOL	17
Butane -1,4-diol (a)	BUTYLENE GLYCOL	17
2,3-Butanediol (a)	BUTYLENE GLYCOL	17
Butane-2,3-diol (a)	BUTYLENE GLYCOL	17
Butane, 2-ethoxy-2-methyl-ether	TERT-AMYL ETHYL ETHER	17
Butanoic acid	BUTYRIC ACID	17
Butanol	N-BUTYL ALCOHOL	18
1-Butanol	N-BUTYL ALCOHOL	18
Butanol-1	N-BUTYL ALCOHOL	18
Butan-1-ol	N-BUTYL ALCOHOL	18
2-Butanol	SEC-BUTYL ALCOHOL	18
Butan-2-ol	SEC-BUTYL ALCOHOL	18
Butanol acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17

Index Name	Product Name	Chapter
2-Butanol acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17
1,4-Butanolide	GAMMA-BUTYROLACTONE	17
Butan-4-olide	GAMMA-BUTYROLACTONE	17
n-Butanol	N-BUTYL ALCOHOL	18
sec-Butanol	SEC-BUTYL ALCOHOL	18
tert-Butanol	TERT-BUTYL ALCOHOL	17
2-Butanone	METHYL ETHYL KETONE	17
Butan-2-one	METHYL ETHYL KETONE	17
2-Butenal	CROTONALDEHYDE	17
Butene dimer	OCTENE (ALL ISOMERS)	17
BUTENE OLIGOMER		17
1-Butoxybutane	N-BUTYL ETHER	17
2-Butoxyethanol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-tert-butoxyethanol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-BUTOXYETHANOL (58%)/HYPERBRANCHED POLYESTERAMIDE (42%) (MIXTURE)		17
2-(2-Butoxyethoxy)ethanol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
2-(2-Butoxyethoxy)ethyl acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
2-Butoxyethyl acetate	ETHYLENE GLYCOL BUTYL ETHER ACETATE	17
1-Butoxypropan-2-ol (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Butyl acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17
BUTYL ACETATE (ALL ISOMERS)		17
n-Butyl acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17
sec-Butyl acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17
tert-Butyl acetate (a)	BUTYL ACETATE (ALL ISOMERS)	17
BUTYL ACRYLATE (ALL ISOMERS)		17
n-Butyl acrylate (a)	BUTYL ACRYLATE (ALL ISOMERS)	17
Butyl alcohol	N-BUTYL ALCOHOL	18
N-BUTYL ALCOHOL		18
SEC-BUTYL ALCOHOL		18
TERT-BUTYL ALCOHOL		17
n-Butyl aldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
BUTYLAMINE (ALL ISOMERS)		17
n-Butylamine (a)	BUTYLAMINE (ALL ISOMERS)	17
sec-Butylamine (a)	BUTYLAMINE (ALL ISOMERS)	17
tert-Butylamine (a)	BUTYLAMINE (ALL ISOMERS)	17
BUTYLBENZENE (ALL ISOMERS)		17
tert-Butylbenzene (a)	BUTYLBENZENE (ALL ISOMERS)	17
BUTYL BENZYL PHTHALATE		17
Butyl butanoate (a)	BUTYL BUTYRATE (ALL ISOMERS)	17
BUTYL BUTYRATE (ALL ISOMERS)		17
n-Butyl butyrate (a)	BUTYL BUTYRATE (ALL ISOMERS)	17
n-Butylcarbinol	N-AMYL ALCOHOL	17
Butyl carbitol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17

Index Name	Product Name	Chapter
Butyl carbitol acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Butyl cellosolve acetate	ETHYLENE GLYCOL BUTYL ETHER ACETATE	17
BUTYL/DECYL/CETYL/EICOSYL METHACRYLATE MIXTURE		17
Butyl/decyl/hexadecyl/icosyl methacrylate mixture (a)	BUTYL/DECYL/CETYL/EICOSYL METHACRYLATE MIXTURE	17
Butyl diglycol acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
BUTYLENE GLYCOL		17
alpha-Butylene glycol (a)	BUTYLENE GLYCOL	17
beta-Butylene glycol (a)	BUTYLENE GLYCOL	17
1,3-Butylene glycol, 3-methyl ether	3-METHOXY-1-BUTANOL	17
1,3-Butylene glycol, 3-methyl ether, 1-acetate	3-METHOXYBUTYL ACETATE	17
Butylene oxide	TETRAHYDROFURAN	17
1,2-BUTYLENE OXIDE		17
Butyl ethanoate	BUTYL ACETATE (ALL ISOMERS)	17
Butyl ether	N-BUTYL ETHER	17
N-BUTYL ETHER		17
Butylethylacetic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
Butylethylene	HEXENE (ALL ISOMERS)	17
tert-Butyl ethyl ether	ETHYL TERT-BUTYL ETHER	17
iso-Butyl ketone	DIISOBUTYL KETONE	17
BUTYL METHACRYLATE		17
tert-Butyl methyl ether	METHYL TERT-BUTYL ETHER	17
Butyl methyl ketone	METHYL BUTYL KETONE	17
Butyl phthalate	DIBUTYL PHTHALATE	17
N-BUTYL PROPIONATE		17
BUTYRALDEHYDE (ALL ISOMERS)		17
n-Butyraldehyde	BUTYRALDEHYDE (ALL ISOMERS)	17
BUTYRIC ACID		17
n-Butyric acid	BUTYRIC ACID	17
Butyric alcohol	N-BUTYL ALCOHOL	18
Butyric aldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
GAMMA-BUTYROLACTONE		17
Cajeputene	DIPENTENE	17
CALCIUM ALKARYL SULPHONATE (C11-C50)		17
Calcium alkyl(longchain) salicylate (overbased) in mineral oil (LOA) (b)	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C13+)	17
CALCIUM ALKYL (C10-C28) SALICYLATE		17
Calcium bis(O-alkylsalicylate) (b)	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C13+)	17
Calcium bromide / zinc bromide solution	DRILLING BRINES (CONTAINING ZINC CHLORIDE)	17
CALCIUM CARBONATE SLURRY		18
CALCIUM HYDROXIDE SLURRY		17
CALCIUM HYPOCHLORITE SOLUTION (15% OR LESS)		17
CALCIUM HYPOCHLORITE SOLUTION (MORE THAN 15%)		17

Index Name	Product Name	Chapter
CALCIUM LIGNOSULPHONATE SOLUTIONS		17
CALCIUM LONG-CHAIN ALKYL (C5-C10) PHENATE		17
CALCIUM LONG-CHAIN ALKYL (C11-C40) PHENATE		17
CALCIUM LONG-CHAIN ALKYL PHENATE SULPHIDE (C8-C40)		17
CALCIUM LONG-CHAIN ALKYL SALICYLATE (C13+)		17
CALCIUM LONG-CHAIN ALKYL (C18-C28) SALICYLATE		17
CALCIUM NITRATE/MAGNESIUM NITRATE/POTASSIUM CHLORIDE SOLUTION		17
CALCIUM NITRATE SOLUTIONS (50% OR LESS)		17
CAMELINA OIL		17
Camelina Sativa Oil	CAMELINA OIL	17
Camelina Sativa Seed Oil	CAMELINA OIL	17
Cane molasses (a)	MOLASSES	18
Canola oil	RAPESEED OIL (LOW ERUCIC ACID CONTAINING LESS THAN 4% FREE FATTY ACIDS)	17
Capric acid	DECANOIC ACID	17
Caproic acid	HEXANOIC ACID	17
Caprolactam	EPSILON-CAPROLACTAM (MOLTEN OR AQUEOUS SOLUTIONS)	17
EPSILON-CAPROLACTAM (MOLTEN OR AQUEOUS SOLUTIONS)		17
Caproyl alcohol	HEXANOL	17
Capryl alcohol (a)	OCTANOL (ALL ISOMERS)	17
Caprylic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
Caprylyl acetate	N-OCTYL ACETATE	17
Carbamide solution	UREA SOLUTION	17
Carbinol	METHYL ALCOHOL (*)	17
Carbitol acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Carbitol solvent (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Carbolic acid	PHENOL	17
CARBOLIC OIL		17
Carbon bisulphide	CARBON DISULPHIDE	17
CARBON DISULPHIDE		17
CARBON TETRACHLORIDE		17
Carbonyldiamide solution	UREA SOLUTION	17
Carbonyldiamine solution	UREA SOLUTION	17
Carboxyethyliminobis(ethylenenitrilo)tetraacetic acid, pentasodium salt solution	DIETHYLENETRIAMINEPENTAACETIC ACID, PENTASODIUM SALT SOLUTION	17
CASHEW NUT SHELL OIL (UNTREATED)		17
CASTOR OIL		17
Caustic potash solution	POTASSIUM HYDROXIDE SOLUTION (*)	17
Caustic soda	SODIUM HYDROXIDE SOLUTION (*)	17
Caustic soda solution	SODIUM HYDROXIDE SOLUTION (*)	17
Cellosolve acetate	2-ETHOXYETHYL ACETATE	17
Cesium formate solution	CESIUM FORMATE SOLUTION (*)	17

Index Name	Product Name	Chapter
CESIUM FORMATE SOLUTION (*)		17
CETYL/EICOSYL METHACRYLATE MIXTURE		17
Cetyl / stearyl alcohol (a)	ALCOHOLS (C13+)	17
China clay	KAOLIN SLURRY	18
CHLORINATED PARAFFINS (C10-C13)		17
CHLORINATED PARAFFINS (C14-C17) (WITH 50% CHLORINE OR MORE, AND LESS THAN 1% C13 OR SHORTER CHAINS)		17
CHLOROACETIC ACID (80% OR LESS)		17
alpha-Chloroallyl chloride	1,3-DICHLOROPROPENE	17
Chloroallylene	ALLYL CHLORIDE	17
CHLOROBENZENE		17
Chlorobenzol	CHLOROBENZENE	17
Chlorobromomethane	BROMOCHLOROMETHANE	17
1-Chloro-2-(beta-chloroethoxy)ethane	DICHLOROETHYL ETHER	17
1-Chloro-2,3-epoxypropane	EPICHLOROHYDRIN	17
2-Chloroethanol	ETHYLENE CHLOROHYDRIN	17
2-Chloro-N-ethoxymethyl-6'-ethylacet-o-toluidide	ACETOCHLOR	17
2-Chloro-N-(ethoxymethyl)-N-(2-ethyl-6-methylphenyl)acetamide	ACETOCHLOR	17
2-Chloroethyl alcohol	ETHYLENE CHLOROHYDRIN	17
beta-Chloroethyl alcohol	ETHYLENE CHLOROHYDRIN	17
Chloroethyl ether	DICHLOROETHYL ETHER	17
2-Chloro-6'-ethyl-N-(2-methoxy-1-methylethyl)acet-o-toluidide	N-(2-METHOXY-1-METHYL ETHYL)-2-ETHYL-6-METHYL CHLOROACETANILIDE	17
2-Chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)acetamide	N-(2-METHOXY-1-METHYL ETHYL)-2-ETHYL-6-METHYL CHLOROACETANILIDE	17
CHLOROFORM		17
CHLOROHYDRINS (CRUDE)		17
m-Chloromethylbenzene	M-CHLOROTOLUENE	17
o-Chloromethylbenzene	O-CHLOROTOLUENE	17
p-Chloromethylbenzene	P-CHLOROTOLUENE	17
(Chloromethyl)ethylene oxide	EPICHLOROHYDRIN	17
(2-Chloro-1-methylethyl) ether	2,2'-DICHLOROISOPROPYL ETHER	17
2-Chloro-1-methylethyl ether	2,2'-DICHLOROISOPROPYL ETHER	17
Chloromethyloxirane	EPICHLOROHYDRIN	17
4-CHLORO-2-METHYLPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION		17
1-Chloro-2-nitrobenzene	O-CHLORONITROBENZENE	17
O-CHLORONITROBENZENE		17
1-(4-CHLOROPHENYL)-4,4- DIMETHYL-PENTAN-3-ONE		17
2- or 3- Chloropropanoic acid	2- OR 3-CHLOROPROPIONIC ACID	17
3-Chloropropene	ALLYL CHLORIDE	17
2- OR 3-CHLOROPROPIONIC ACID		17
alpha- or beta- Chloropropionic acid	2- OR 3-CHLOROPROPIONIC ACID	17
3-Chloropropylene	ALLYL CHLORIDE	17
alpha-Chloropropylene	ALLYL CHLORIDE	17
Chloropropylene oxide	EPICHLOROHYDRIN	17

Index Name	Product Name	Chapter
CHLOROSULPHONIC ACID		17
Chlorosulphuric acid	CHLOROSULPHONIC ACID	17
3-Chlorotoluene	M-CHLOROTOLUENE	17
4-Chlorotoluene	P-CHLOROTOLUENE	17
alpha-Chlorotoluene	BENZYL CHLORIDE	17
M-CHLOROTOLUENE		17
O-CHLOROTOLUENE		17
P-CHLOROTOLUENE		17
CHLOROTOLUENES (MIXED ISOMERS)		17
CHOLINE CHLORIDE SOLUTIONS		17
Cinene	DIPENTENE	17
Cinnamene	STYRENE MONOMER	17
Cinnamol	STYRENE MONOMER	17
cis-Butenedioic anhydride	MALEIC ANHYDRIDE	17
cis-9-Octadecenoic acid	OLEIC ACID	17
CITRIC ACID (70% OR LESS)		17
CLAY SLURRY		18
COAL SLURRY		18
COAL TAR		17
Coal tar distillate	COAL TAR NAPHTHA SOLVENT	17
COAL TAR NAPHTHA SOLVENT		17
COAL TAR PITCH (MOLTEN) (*)		17
COCOA BUTTER		17
COCONUT OIL		17
COCONUT OIL FATTY ACID		17
COCONUT OIL FATTY ACID METHYL ESTER		17
Colamine	ETHANOLAMINE	17
Cold pressed grape seed oil	GRAPE SEED OIL	17
Cologne spirits	ETHYL ALCOHOL	18
Colonial spirit	METHYL ALCOHOL (*)	17
Colophony	ROSIN	17
Columbian spirit	METHYL ALCOHOL (*)	17
Columbian spirits	METHYL ALCOHOL (*)	17
COPPER SALT OF LONG CHAIN (C17+) ALKANOIC ACID		17
CORN OIL		17
COTTON SEED OIL		17
CREOSOTE (COAL TAR)		17
CRESOL/PHENOL/XYLENOL MIXTURE		17
CRESOLS (ALL ISOMERS)		17
CRESYLIC ACID, DEPHENOLIZED		17
Cresylic acids	CRESOLS (ALL ISOMERS)	17
CRESYLIC ACID, SODIUM SALT SOLUTION		17
Cresylols	CRESOLS (ALL ISOMERS)	17

Index Name	Product Name	Chapter
CROTONALDEHYDE		17
Crotonic aldehyde	CROTONALDEHYDE	17
Crude grape seed oil	GRAPE SEED OIL	17
CTMP (Chemi Thermo Mechanical Pulp) concentrate	WOOD LIGNIN WITH SODIUM ACETATE/OXALATE	17
Cumene (a)	PROPYLBENZENE (ALL ISOMERS)	17
Cumol (a)	PROPYLBENZENE (ALL ISOMERS)	17
Cyanoethylene	ACRYLONITRILE	17
2-Cyanopropan-2-ol	ACETONE CYANOHYDRIN	17
2-Cyano-2-propanol	ACETONE CYANOHYDRIN	17
2-cyanopropene-1	METHACRYLONITRILE	17
Cyclic propylene carbonate	PROPYLENE CARBONATE	17
1,5,9-CYCLODODECATRIENE		17
CYCLOHEPTANE		17
Cyclohexamethylenimine	HEXAMETHYLENIMINE	17
CYCLOHEXANE		17
CYCLOHEXANE-1,2-DICARBOXYLIC ACID, DIISONONYL ESTER		17
Cyclohexane 1,2-Di-Isononyldicarboxylate	CYCLOHEXANE-1,2-DICARBOXYLIC ACID, DIISONONYL ESTER	17
CYCLOHEXANE OXIDATION PRODUCTS, SODIUM SALTS SOLUTION		17
Cyclohexane, oxidized, aqueous extraction, sodium salt	CYCLOHEXANE OXIDATION PRODUCTS, SODIUM SALTS SOLUTION	17
CYCLOHEXANOL		17
CYCLOHEXANONE		17
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE		17
Cyclohexatriene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
CYCLOHEXYL ACETATE		17
CYCLOHEXYLAMINE		17
Cyclohexyldimethylamine	N,N-DIMETHYLCYCLOHEXYLAMINE	17
Cyclohexyl(ethyl)amine	N-ETHYLCYCLOHEXYLAMINE	17
Cyclohexyl(ethyl)amine	N-ETHYLCYCLOHEXYLAMINE	17
Cyclohexyl ketone	CYCLOHEXANONE	17
Cyclohexylmethane	METHYLCYCLOHEXANE	17
1,3-CYCLOPENTADIENE DIMER (MOLTEN)		17
CYCLOPENTANE		17
CYCLOPENTENE		17
Cyclotetramethylene oxide	TETRAHYDROFURAN	17
P-CYMENE		17
Cymol	P-CYMENE	17
Dalapon (ISO)	2,2-DICHLOROPROPIONIC ACID	17
DCCP	DICYCLOPENTADIENE, RESIN GRADE, 81-89%	17
Deanol	DIMETHYLETHANOLAMINE	17
DECAHYDRONAPHTHALENE		17
DECANOIC ACID		17

Index Name	Product Name	Chapter
Decan-1-ol	DECYL ALCOHOL (ALL ISOMERS)	17
n-Decanol	DECYL ALCOHOL (ALL ISOMERS)	17
Decanoic acid	DECANOIC ACID	17
DECENE		17
Decoic acid	DECANOIC ACID	17
DECYL ACRYLATE		17
Decyl alcohol	DECYL ALCOHOL (ALL ISOMERS)	17
DECYL ALCOHOL (ALL ISOMERS)		17
Decylbenzene (a)	ALKYL(C9+)BENZENES	17
DECYL/DODECYL/TETRADECYL ALCOHOL MIXTURE		17
Decylic acid	DECANOIC ACID	17
Decyl octyl adipate	OCTYL DECYL ADIPATE	17
DECYLOXYTETRAHYDROTHIOPHENE DIOXIDE		17
Degummed grape seed oil	GRAPE SEED OIL	17
1-Deoxy-1-methylamino-D-glucitol solution (70% or less)	N-METHYLGLUCAMINE SOLUTION (70% OR LESS)	17
Detergent alkylate	ALKYL(C9+)BENZENES	17
Diacetic ester	ETHYL ACETOACETATE	17
Diacetone	DIACETONE ALCOHOL	17
DIACETONE ALCOHOL		17
Di[alkyl/alkenyl(C10-C20)] hydrogen phosphite (a)	ALKYL (C10-C20, SATURATED AND UNSATURATED) PHOSPHITE	17
DIALKYL (C8-C9) DIPHENYLAMINES		17
DIALKYL (C7-C13) PHTHALATES		17
DIALKYL (C9 - C10) PHTHALATES		17
DIALKYL THIOPHOSPHATES SODIUM SALTS SOLUTION		17
1,2-Diaminoethane	ETHYLENEDIAMINE	17
1,6-Diaminohexane	HEXAMETHYLENEDIAMINE (MOLTEN)	17
1,6-Diaminohexane solutions	HEXAMETHYLENEDIAMINE SOLUTION	17
2,6-Diaminohexanoic acid	L-LYSINE SOLUTION (60% OR LESS)	17
2,6-DIAMINOHEXANOIC ACID PHOSPHONATE MIXED SALTS SOLUTION		17
Diaminotoluene (a)	TOLUENEDIAMINE	17
2,4-Diaminotoluene (a)	TOLUENEDIAMINE	17
2,6-Diaminotoluene (a)	TOLUENEDIAMINE	17
3,6-Diazaoctane-1,8-diamine	TRIETHYLENETETRAMINE	17
1,2-Dibromoethane	ETHYLENE DIBROMIDE	17
DIBROMOMETHANE		17
2,2'-Dibutoxyethyl ether	DIETHYLENE GLYCOL DIBUTYL ETHER	17
DIBUTYLAMINE		17
Dibutylbenzene-1,2-dicarboxylate	DIBUTYL PHTHALATE	17
Dibutyl carbinol (a)	NONYL ALCOHOL (ALL ISOMERS)	17
Dibutyl ether	N-BUTYL ETHER	17
n-Dibutyl ether	N-BUTYL ETHER	17
Dibutyl hydrogen phosphite	DIBUTYL HYDROGEN PHOSPHONATE	17
DIBUTYL HYDROGEN PHOSPHONATE		17

Index Name	Product Name	Chapter
2,6-DI-TERT-BUTYLPHENOL		17
Dibutyl phosphonate	DIBUTYL HYDROGEN PHOSPHONATE	17
DIBUTYL PHTHALATE		17
Dibutyl ortho-phthalate	DIBUTYL PHTHALATE	17
DIBUTYL TEREPHTHALATE		17
DICHLOROBENZENE (ALL ISOMERS)		17
1,2-Dichlorobenzene (a)	DICHLOROBENZENE (ALL ISOMERS)	17
m-Dichlorobenzene (a)	DICHLOROBENZENE (ALL ISOMERS)	17
o-Dichlorobenzene (a)	DICHLOROBENZENE (ALL ISOMERS)	17
3,4-Dichlorobut-1-ene	3,4-DICHLORO-1-BUTENE	17
3,4-DICHLORO-1-BUTENE		17
2,2'-Dichlorodiethyl ether	DICHLOROETHYL ETHER	17
Dichlorodiisopropyl ether	2,2'-DICHLOROISOPROPYL ETHER	17
1,1-DICHLOROETHANE		17
1,2-Dichloroethane	ETHYLENE DICHLORIDE	17
1,1-Dichloroethene	VINYLDENE CHLORIDE	17
Dichloroether	DICHLOROETHYL ETHER	17
1,1-Dichloroethylene	VINYLDENE CHLORIDE	17
DICHLOROETHYL ETHER		17
2,2'-Dichloroethyl ether	DICHLOROETHYL ETHER	17
Dichloroethyl oxide	DICHLOROETHYL ETHER	17
1,6-DICHLOROHEXANE		17
2,2'-DICHLOROISOPROPYL ETHER		17
DICHLOROMETHANE		17
2,4-DICHLOROPHENOL		17
2,4-DICHLOROPHENOXYACETIC ACID, DIETHANOLAMINE SALT SOLUTION		17
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% OR LESS)		17
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION		17
1,1-DICHLOROPROPANE		17
1,2-DICHLOROPROPANE		17
Dichloropropane / dichloropropene mixtures	DICHLOROPROPENE/DICHLOROPROPANE MIXTURES	17
2,2-Dichloropropanoic acid	2,2-DICHLOROPROPIONIC ACID	17
1,3-DICHLOROPROPENE		17
DICHLOROPROPENE/DICHLOROPROPANE MIXTURES		17
2,2-DICHLOROPROPIONIC ACID		17
Dichloropropylene	1,3-DICHLOROPROPENE	17
1,4-Dicyanobutane	ADIPONITRILE	17
Dicyclopentadiene	1,3-CYCLOPENTADIENE DIMER (MOLTEN)	17
DICYCLOPENTADIENE, RESIN GRADE, 81-89%		17
Didecyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
Didodecyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
DIETHANOLAMINE		17

Index Name	Product Name	Chapter
DIETHYLAMINE		17
DIETHYLAMINOETHANOL		17
2-Diethylaminoethanol	DIETHYLAMINOETHANOL	17
2,6-DIETHYLANILINE		17
DIETHYLBENZENE		17
Diethyl 'carbitol'	DIETHYLENE GLYCOL DIETHYL ETHER	17
Diethylene dioxide	1,4-DIOXANE	17
1,4-Diethylene dioxide	1,4-DIOXANE	17
Diethylene ether	1,4-DIOXANE	17
DIETHYLENE GLYCOL		17
Diethylene glycol butyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol butyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
DIETHYLENE GLYCOL DIBUTYL ETHER		17
DIETHYLENE GLYCOL DIETHYL ETHER		17
Diethylene glycol ethyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol ethyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Diethylene glycol methyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol methyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Diethylene glycol monobutyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol monobutyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Diethylene glycol monoethyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol monoethyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Diethylene glycol monomethyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Diethylene glycol monomethyl ether acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
DIETHYLENE GLYCOL PHTHALATE		17
DIETHYLENETRIAMINE		17
DIETHYLENETRIAMINEPENTAACETIC ACID, PENTASODIUM SALT SOLUTION		17
N,N-Diethylethanamine	TRIETHYLAMINE	17
N,N-Diethylethanolamine	DIETHYLAMINOETHANOL	17
DIETHYL ETHER (*)		17
DI-(2-ETHYLHEXYL) ADIPATE		17
DI-(2-ETHYLHEXYL) PHOSPHORIC ACID		17
Di (2-ethylhexyl) Terephthalate	BIS(2-ETHYLHEXYL) TEREPHTHALATE	17
Diethyl oxide	DIETHYL ETHER (*)	17
DIETHYL PHTHALATE		17
DIETHYL SULPHATE		17
Diformyl	GLYOXAL SOLUTION (40% OR LESS)	17

Index Name	Product Name	Chapter
DIGLYCIDYL ETHER OF BISPHENOL A		17
DIGLYCIDYL ETHER OF BISPHENOL F		17
Diglycol	DIETHYLENE GLYCOL	17
Diglycolamine	2-(2-AMINOETHOXY) ETHANOL	17
Diglycol phthalate	DIETHYLENE GLYCOL PHTHALATE	17
DIHEPTYL PHTHALATE		17
DI-N-HEXYL ADIPATE		17
DIHEXYL PHTHALATE		17
1,3-Dihydroisobenzofuran-1,3-dione (molten)	PHTHALIC ANHYDRIDE (MOLTEN)	17
2,3-Dihydroxybutane (a)	BUTYLENE GLYCOL	17
2,2'-Dihydroxydiethylamine	DIETHANOLAMINE	17
Di-(2-hydroxyethyl)amine	DIETHANOLAMINE	17
Dihydroxyethyl ether	DIETHYLENE GLYCOL	17
1,6-Dihydroxyhexane	HEXAMETHYLENE GLYCOL	17
1,2-Dihydroxypropane	PROPYLENE GLYCOL	18
Diisobutene	DIISOBUTYLENE	17
DIISOBUTYLAMINE		17
Diisobutylcarbinol (a)	NONYL ALCOHOL (ALL ISOMERS)	17
DIISOBUTYLENE		17
alpha-Diisobutylene (a)	DIISOBUTYLENE	17
beta-Diisobutylene (a)	DIISOBUTYLENE	17
DIISOBUTYL KETONE		17
DIISOBUTYL PHTHALATE		17
2,4-diisocyanato-1-methylbenzene	TOLUENE DIISOCYANATE	17
2,4-Diisocyanatotoluene	TOLUENE DIISOCYANATE	17
Diisodecyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
DIISONONYL ADIPATE		17
Diisononyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
DIISOCTYL PHTHALATE		17
DIISOPROPANOLAMINE		17
DIISOPROPYLAMINE		17
DIISOPROPYLBENZENE (ALL ISOMERS)		17
Diisopropyl ether	ISOPROPYL ETHER	17
DIISOPROPYLNAPHTHALENE		17
Diisopropyl oxide	ISOPROPYL ETHER	17
N,N-DIMETHYLACETAMIDE		17
N,N-DIMETHYLACETAMIDE SOLUTION (40% OR LESS)		17
Dimethylacetylene carbinol	2-METHYL-2-HYDROXY-3-BUTYNE	17
DIMETHYL ADIPATE		17
DIMETHYLAMINE SOLUTION (45% OR LESS)		17
DIMETHYLAMINE SOLUTION (GREATER THAN 45% BUT NOT GREATER THAN 55%)		17
DIMETHYLAMINE SOLUTION (GREATER THAN 55% BUT NOT GREATER THAN 65%)		17
Dimethylaminoethanol	DIMETHYLETHANOLAMINE	17

Index Name	Product Name	Chapter
2-(Dimethylamino)ethanol	DIMETHYLETHANOLAMINE	17
Dimethylbenzenes	XYLENES	17
1,3-Dimethylbutanol	METHYLAMYL ALCOHOL	17
1,3-Dimethylbutan-1-ol	METHYLAMYL ALCOHOL	17
1,3-Dimethylbutyl acetate (a)	METHYLAMYL ACETATE	17
Dimethylcarbinol	ISOPROPYL ALCOHOL	18
N,N-DIMETHYLCYCLOHEXYLAMINE		17
DIMETHYL DISULPHIDE		17
N,N-Dimethyldodecanamine	N,N-DIMETHYLDODECYLAMINE	17
N,N-Dimethyldodecan-1-amine	N,N-DIMETHYLDODECYLAMINE	17
N,N-DIMETHYLDODECYLAMINE		17
1,1-Dimethylethanol	TERT-BUTYL ALCOHOL	17
DIMETHYLETHANOLAMINE		17
1,1-Dimethylethyl alcohol	TERT-BUTYL ALCOHOL	17
Dimethyl ethyl carbinol	TERT-AMYL ALCOHOL	17
1,1-dimethylethyl methyl ether	METHYL TERT-BUTYL ETHER	17
Dimethylformaldehyde	ACETONE	18
DIMETHYLFORMAMIDE		17
DIMETHYL GLUTARATE		17
2,6-Dimethyl-4-heptanone	DIISOBUTYL KETONE	17
2,6-Dimethylheptan-4-one	DIISOBUTYL KETONE	17
N,N-Dimethylhexanamine (a)	ALKYL (C12+) DIMETHYLAMINE	17
DIMETHYL HYDROGEN PHOSPHITE		17
Dimethylhydroxybenzenes (all isomers)	XYLENOL	17
1,1'-Dimethyl-2,2'-iminodiethanol	DIISOPROPANOLAMINE	17
Dimethyl ketal	ACETONE	18
Dimethyl ketone	ACETONE	18
N,N-dimethylaurylamine	N,N-DIMETHYLDODECYLAMINE	17
N,N-Dimethylmethanamine solution (30% or less)	TRIMETHYLAMINE SOLUTION (30% OR LESS)	17
6,6-Dimethyl-2-methylenebicyclo[3.1.1]heptane	BETA-PINENE	17
DIMETHYL OCTANOIC ACID		17
2,2-Dimethyloctanoic acid (a)	NEODECANOIC ACID	17
2,3-Dimethylphenol (a)	XYLENOL	17
2,4-Dimethylphenol (a)	XYLENOL	17
2,5-Dimethylphenol (a)	XYLENOL	17
2,6-Dimethylphenol (a)	XYLENOL	17
3,4-Dimethylphenol (a)	XYLENOL	17
3,5-Dimethylphenol (a)	XYLENOL	17
Dimethylphenols	XYLENOL	17
Dimethylphenyl phosphate (3:1) (all isomers)	TRIXYLYL PHOSPHATE	17
DIMETHYL PHTHALATE		17
DIMETHYLPOLYSILOXANE		17
2,2-Dimethylpropane (a)	PENTANE (ALL ISOMERS)	17
2,2-DIMETHYLPROPANE-1,3-DIOL (MOLTEN OR SOLUTION)		17
2,2-Dimethylpropanoic acid	TRIMETHYLACETIC ACID	17

Index Name	Product Name	Chapter
1,1-Dimethylpropargyl alcohol	2-METHYL-2-HYDROXY-3-BUTYNE	17
2,2-Dimethylpropionic acid	TRIMETHYLACETIC ACID	17
1,1-Dimethylpropyl ethyl ether	TERT-AMYL ETHYL ETHER	17
1,1-Dimethylpropynol	2-METHYL-2-HYDROXY-3-BUTYNE	17
DIMETHYL SUCCINATE		17
N,N-Dimethyltetradecanamine (a)	ALKYL (C12+) DIMETHYLAMINE	17
Dimethyl(tetradecyl)amine (a)	ALKYL (C12+) DIMETHYLAMINE	17
3,9-Dimethyltricyclo[5.2.1.0 ^{2,6}]deca-3,9-diene	METHYLCYCLOPENTADIENE DIMER	17
Dimethyltrimethylene glycol	2,2-DIMETHYLPROPANE-1,3-DIOL (MOLTEN OR SOLUTION)	17
DINITROTOLUENE (MOLTEN)		17
DINONYL PHTHALATE		17
Dinonyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
3,6-Dioxaoctane-1,8-diol	TRIETHYLENE GLYCOL	18
Diocyl adipate	DI-(2-ETHYLHEXYL) ADIPATE	17
Diocyl hydrogen phosphate	DI-(2-ETHYLHEXYL) PHOSPHORIC ACID	17
Diocyl phosphoric acid	DI-(2-ETHYLHEXYL) PHOSPHORIC ACID	17
DIOCTYL PHTHALATE		17
Diocyl terephthalate	BIS(2-ETHYLHEXYL) TEREPHTHALATE	17
2,4-D-diolamine	2,4-DICHLOROPHOXYACETIC ACID, DIETHANOLAMINE SALT SOLUTION	17
1,4-Dioxan	1,4-DIOXANE	17
1,4-DIOXANE		17
1,3-Dioxolan-2-one	ETHYLENE CARBONATE	17
Dioxolone-2	ETHYLENE CARBONATE	17
1,1-Dioxothiolan	SULPHOLANE	17
Dioxyethylene ether	1,4-DIOXANE	17
DIPENTENE		17
DIPHENYL		17
DIPHENYLAMINE (MOLTEN)		17
DIPHENYLAMINE, REACTION PRODUCT WITH 2,2,4-TRIMETHYLPENTENE		17
DIPHENYLAMINES, ALKYLATED		17
DIPHENYL/DIPHENYL ETHER MIXTURES		17
Diphenyl/diphenyl oxide mixtures	DIPHENYL/DIPHENYL ETHER MIXTURES	17
Diphenyl dodecyl ether disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION	17
Diphenyl dodecyl oxide disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION	17
DIPHENYL ETHER		17
DIPHENYL ETHER/DIPHENYL PHENYL ETHER MIXTURE		17
DIPHENYLMETHANE DIISOCYANATE		17
DIPHENYLOL PROPANE-EPICHLOROHYDRIN RESINS		17
Diphenyl oxide	DIPHENYL ETHER	17
Diphenyl oxide / diphenyl phenyl ether mixture	DIPHENYL ETHER/DIPHENYL PHENYL ETHER MIXTURE	17
Dipropylamine	DI-N-PROPYLAMINE	17

Index Name	Product Name	Chapter
n-Dipropylamine	DI-N-PROPYLAMINE	17
DI-N-PROPYLAMINE		17
DIPROPYLENE GLYCOL		17
Dipropylene glycol methyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Dipropylene glycol monomethyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Disodium carbonate solution	SODIUM CARBONATE SOLUTION (*)	17
Distillates (Petroleum), Steam Cracked, C8 - C12 Fraction (a)	RESIN OIL, DISTILLED	17
DITHIOCARBAMATE ESTER (C7-C35)		17
DITRIDECYL ADIPATE		17
DITRIDECYL PHTHALATE		17
DIUNDECYL PHTHALATE		17
dl-Lactic acid	LACTIC ACID	17
dl-p-Mentha-1,8-diene	DIPENTENE	17
1-Docosanol (a)	ALCOHOLS (C13+)	17
Docosan-1-ol (a)	ALCOHOLS (C13+)	17
DODECANE (ALL ISOMERS)		17
1-Dodecanethiol	N-DODECYL MERCAPTAN	17
TERT-DODECANETHIOL		17
Dodecanoic acid	LAURIC ACID	17
1-Dodecanol	DODECYL ALCOHOL	17
Dodecan-1-ol	DODECYL ALCOHOL	17
n-Dodecanol	DODECYL ALCOHOL	17
DODECENE (ALL ISOMERS)		17
1-DODECENE		17
Dodec-1-ene	1-DODECENE	17
DODECYL ALCOHOL		17
n-Dodecyl alcohol	DODECYL ALCOHOL	17
DODECYLAMINE/TETRADECYLAMINE MIXTURE		17
DODECYLBENZENE		17
Dodecylbenzenesulphonic acid (contains 1.5% sulphuric acid)	ALKYL (C11-C17) BENZENE SULPHONIC ACID	17
Dodecyldimethylamine	N,N-DIMETHYLDODECYLAMINE	17
DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION		17
Dodecyl diphenyl oxide disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION	17
Dodecylene	DODECENE (ALL ISOMERS)	17
DODECYL HYDROXYPROPYL SULPHIDE		17
Dodecylic acid	LAURIC ACID	17
N-DODECYL MERCAPTAN		17
tert-Dodecyl mercaptan	TERT-DODECANETHIOL	17
DODECYL METHACRYLATE		17
Dodecyl 2-methylprop-2-enoate	DODECYL METHACRYLATE	17
Dodecyl-2-methyl-2-propenoate	DODECYL METHACRYLATE	17
DODECYL/OCTADECYL METHACRYLATE MIXTURE		17

Index Name	Product Name	Chapter
DODECYL/PENTADECYL METHACRYLATE MIXTURE		17
DODECYL PHENOL		17
Dodecyl, Tetradecyl, hexadecyl-dimethylamine mixture	ALKYL (C12+) DIMETHYLAMINE	17
2-Dodecylthio-1-methylethanol	DODECYL HYDROXYPROPYL SULPHIDE	17
1-(Dodecylthio)propan-2-ol	DODECYL HYDROXYPROPYL SULPHIDE	17
DODECYL XYLENE		17
Drilling brine: potassium chloride solution	POTASSIUM CHLORIDE SOLUTION	17
DRILLING BRINES (CONTAINING CALCIUM BROMIDE)		17
DRILLING BRINES (CONTAINING ZINC CHLORIDE)		17
(E)-But-2-enal	CROTONALDEHYDE	17
Enanthic acid	N-HEPTANOIC ACID	17
Enanthylic acid	N-HEPTANOIC ACID	17
Engravers' acid	NITRIC ACID (70% AND OVER)	17
EPOCHLOROHYDRIN		17
1,2-Epoxybutane	1,2-BUTYLENE OXIDE	17
1,4-epoxybutane	TETRAHYDROFURAN	17
1,2-Epoxypropane	PROPYLENE OXIDE	17
2,3-Epoxypropyl ester of mixed C10 trialkylacetic acids	GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID	17
2,3-Epoxypropyl neodecanoate	GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID	17
EPTC	S-ETHYL DIPROPYLTHIOCARBAMATE	17
Essence of Mirbane	NITROBENZENE	17
Essence of Myrbane	NITROBENZENE	17
Ethanamine solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)	17
Ethane carbonitrile	PROPIONITRILE	17
Ethanedial	GLYOXAL SOLUTION (40% OR LESS)	17
1,2-Ethanedial	ETHYLENE GLYCOL	17
Ethanoic acid	ACETIC ACID	17
Ethanoic anhydride	ACETIC ANHYDRIDE	17
Ethanol	ETHYL ALCOHOL	18
ETHANOLAMINE		17
ethenyl acetate	VINYL ACETATE	17
ethenyl ethanoate	VINYL ACETATE	17
Ether	DIETHYL ETHER (*)	17
Ethinyl trichloride	TRICHLOROETHYLENE	17
2-Ethoxyethanol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-(2-Ethoxyethoxy)ethanol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
2-(2-Ethoxyethoxy)ethyl acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER ACETATE	17
2-ETHOXYETHYL ACETATE		17
ETHOXYLATED LONG CHAIN (C16+) ALKYL OXYALKYLAMINE		17
ETHOXYLATED TALLOW AMINE (> 95%)		17
2-Ethoxy-2-methylpropane	ETHYL TERT-BUTYL ETHER	17
1-Ethoxypropan-2-ol (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
ETHYL ACETATE		17

Index Name	Product Name	Chapter
ETHYL ACETOACETATE		17
Ethyl acetone	METHYL PROPYL KETONE	17
ETHYL ACRYLATE		17
ETHYL ALCOHOL		18
ETHYLAMINE (*)		17
ETHYLAMINE SOLUTIONS (72% OR LESS)		17
Ethylaminocyclohexane	N-ETHYLCYCLOHEXYLAMINE	17
ETHYL AMYL KETONE		17
ETHYLBENZENE		17
Ethyl benzol	ETHYLBENZENE	17
Ethyl butanoate	ETHYL BUTYRATE	17
ETHYL TERT-BUTYL ETHER		17
ETHYL BUTYRATE		17
2-Ethylcaproic acid	2-ETHYLHEXANOIC ACID	17
Ethyl carbinol	N-PROPYL ALCOHOL	17
Ethyl cyanide	PROPIONITRILE	17
ETHYLCYCLOHEXANE		17
N-ETHYLCYCLOHEXYLAMINE		17
Ethyl dimethylmethane (a)	PENTANE (ALL ISOMERS)	17
S-Ethyl dipropylcarbamoate	S-ETHYL DIPROPYLTHIOCARBAMATE	17
S-ETHYL DIPROPYLTHIOCARBAMATE		17
Ethylene alcohol	ETHYLENE GLYCOL	17
Ethylene bis(iminodiacetic acid) tetrasodium salt solution	ETHYLENEDIAMINETETRAACETIC ACID, TETRASODIUM SALT SOLUTION	17
Ethylene bromide	ETHYLENE DIBROMIDE	17
ETHYLENE CARBONATE		17
Ethylenecarboxylic acid	ACRYLIC ACID	17
Ethylene chloride	ETHYLENE DICHLORIDE	17
ETHYLENE CHLOROHRIDIN		17
ETHYLENE CYANOHRIDIN		17
Ethylene diacetate	ETHYLENE GLYCOL DIACETATE	17
ETHYLENEDIAMINE		17
ETHYLENEDIAMINETETRAACETIC ACID, TETRASODIUM SALT SOLUTION		17
ETHYLENE DIBROMIDE		17
ETHYLENE DICHLORIDE		17
Ethylenedinitrotetraacetic acid tetrasodium salt solution	ETHYLENEDIAMINETETRAACETIC ACID, TETRASODIUM SALT SOLUTION	17
2,2'-Ethylenedioxydiethanol	TRIETHYLENE GLYCOL	18
ETHYLENE GLYCOL		17
ETHYLENE GLYCOL ACETATE		17
Ethylene glycol acrylate	2-HYDROXYETHYL ACRYLATE	17
Ethylene glycol butyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
ETHYLENE GLYCOL BUTYL ETHER ACETATE		17

Index Name	Product Name	Chapter
Ethylene glycol n-butyl ether (58%)/ Hyperbranched polyesteramide (42%)	2-BUTOXYETHANOL (58%)/HYPERBRANCHED POLYESTERAMIDE (42%) (MIXTURE)	17
Ethylene glycol tert-butyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
ETHYLENE GLYCOL DIACETATE		17
Ethylene glycol ethyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol ethyl ether acetate	2-ETHOXYETHYL ACETATE	17
Ethylene glycol isopropyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol methyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
ETHYLENE GLYCOL METHYL ETHER ACETATE		17
ETHYLENE GLYCOL MONOALKYL ETHERS		17
Ethylene glycol monoalkyl ethers (58%)/ Hyperbranched polyesteramide (42%)	2-BUTOXYETHANOL (58%)/HYPERBRANCHED POLYESTERAMIDE (42%) (MIXTURE)	17
Ethylene glycol monobutyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol monobutyl ether (58%)/ Hyperbranched polyesteramide (42%)	2-BUTOXYETHANOL (58%)/HYPERBRANCHED POLYESTERAMIDE (42%) (MIXTURE)	17
Ethylene glycol mono-tert-butyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol monoethyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol monoethyl ether acetate	2-ETHOXYETHYL ACETATE	17
Ethylene glycol monomethyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Ethylene glycol monomethyl ether acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE	17
Ethylene glycol monophenyl ether	ETHYLENE GLYCOL PHENYL ETHER	17
ETHYLENE GLYCOL PHENYL ETHER		17
ETHYLENE GLYCOL PHENYL ETHER/DIETHYLENE GLYCOL PHENYL ETHER MIXTURE		17
ETHYLENE GLYCOL (>75%)/SODIUM ALKYL CARBOXYLATES/BORAX MIXTURE		17
ETHYLENE GLYCOL (>85%)/SODIUM ALKYL CARBOXYLATES MIXTURE		17
ETHYLENE OXIDE/PROPYLENE OXIDE MIXTURE WITH AN ETHYLENE OXIDE CONTENT OF NOT MORE THAN 30% BY MASS		17
Ethylene tetrachloride	PERCHLOROETHYLENE	17
Ethylene trichloride	TRICHLOROETHYLENE	17
ETHYLENE-VINYL ACETATE COPOLYMER (EMULSION)		17
Ethyl ethanoate	ETHYL ACETATE	17
Ethyl ether	DIETHYL ETHER (*)	17
ETHYL-3-ETHOXYPROPIONATE		17
Ethyl fluid (a)	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYL)	17
Ethylformic acid	PROPIONIC ACID	17
Ethyl glycol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-Ethylhexaldehyde (a)	OCTYL ALDEHYDES	17
2-Ethylhexanal (a)	OCTYL ALDEHYDES	17
2-ETHYLHEXANOIC ACID		17
2-Ethylhexanol (a)	OCTANOL (ALL ISOMERS)	17
2-Ethylhexenal	2-ETHYL-3-PROPYLACROLEIN	17
2-Ethylhex-2-enal	2-ETHYL-3-PROPYLACROLEIN	17

Index Name	Product Name	Chapter
2-Ethylhexoic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
2-ETHYLHEXYL ACRYLATE		17
2-Ethylhexyl alcohol (a)	OCTANOL (ALL ISOMERS)	17
2-ETHYLHEXYLAMINE		17
2-ETHYL-2-(HYDROXYMETHYL) PROPANE-1,3-DIOL (C8-C10) ESTER		17
Ethyllic acid	ACETIC ACID	17
5-Ethylidenebicyclo(2.2.1)hept-2-ene	ETHYLIDENE NORBORNENE	17
Ethylidene chloride	1,1-DICHLOROETHANE	17
ETHYLIDENE NORBORNENE		17
ETHYL METHACRYLATE		17
N-ETHYLMETHYLALLYLAMINE		17
N-Ethyl-2-methylallylamine	N-ETHYLMETHYLALLYLAMINE	17
2-Ethyl-6-methylaniline	2-METHYL-6-ETHYL ANILINE	17
2-Ethyl-6-methylbenzenamine	2-METHYL-6-ETHYL ANILINE	17
1-ethyl-4-methylbenzene	ETHYL TOLUENE	17
Ethyl methyl ketone	METHYL ETHYL KETONE	17
5-Ethyl-2-methylpyridine	2-METHYL-5-ETHYL PYRIDINE	17
Ethyl oxide	DIETHYL ETHER (*)	17
Ethyl phosphate	TRIETHYL PHOSPHATE	17
Ethyl phthalate	DIETHYL PHTHALATE	17
5-Ethyl-2-picoline	2-METHYL-5-ETHYL PYRIDINE	17
Ethyl propenoate	ETHYL ACRYLATE	17
ETHYL PROPIONATE		17
2-ETHYL-3-PROPYLACROLEIN		17
Ethyl sulphate	DIETHYL SULPHATE	17
ETHYL TOLUENE		17
6-Ethyl-2-toluidine	2-METHYL-6-ETHYL ANILINE	17
6-Ethyl-o-toluidine	2-METHYL-6-ETHYL ANILINE	17
Ethyl vinyl ether	VINYL ETHYL ETHER	17
Extra virgin grape seed oil	GRAPE SEED OIL	17
FATTY ACID (SATURATED C13+)		17
FATTY ACID METHYL ESTERS (M)		17
FATTY ACIDS, (C8-C10)		17
FATTY ACIDS, (C12+)		17
FATTY ACIDS, (C16+)		17
FATTY ACIDS, ESSENTIALLY LINEAR (C6-C18) 2-ETHYLHEXYL ESTER		17
Feeding corn molasses (a)	MOLASSES	18
Fermentation alcohol	ETHYL ALCOHOL	18
FERRIC CHLORIDE SOLUTIONS		17
FERRIC NITRATE/NITRIC ACID SOLUTION		17
FISH OIL		17
FISH PROTEIN CONCENTRATE (CONTAINING 4% OR LESS FORMIC ACID)		17

Index Name	Product Name	Chapter
FISH SILAGE PROTEIN CONCENTRATE (CONTAINING 4% OR LESS FORMIC ACID)		17
FLUOROSILICIC ACID SOLUTION (20-30%)		17
FORMALDEHYDE SOLUTIONS (45% OR LESS)		17
Formaldehyde trimer	1,3,5-TRIOXANE	17
Formalin	FORMALDEHYDE SOLUTIONS (45% OR LESS)	17
FORMAMIDE		17
Formdimethylamide	DIMETHYLFORMAMIDE	17
FORMIC ACID (85% OR LESS ACID)		17
FORMIC ACID (OVER 85%)		17
FORMIC ACID MIXTURE (CONTAINING UP TO 18% PROPIONIC ACID AND UP TO 25% SODIUM FORMATE)		17
Formic aldehyde	FORMALDEHYDE SOLUTIONS (45% OR LESS)	17
Formylformic acid	GLYOXYLIC ACID SOLUTION (50 % OR LESS)	17
Fural	FURFURAL	17
2-Furaldehyde	FURFURAL	17
2,5-Furandione	MALEIC ANHYDRIDE	17
Furan-2,5-dione	MALEIC ANHYDRIDE	17
FURFURAL		17
2-Furfuraldehyde	FURFURAL	17
FURFURYL ALCOHOL		17
Furylcarbinol	FURFURYL ALCOHOL	17
Fused poly(2+)cyclic aromatic hydrocarbons (b)	POLY(2+)CYCLIC AROMATICS	17
Gaultheria oil	METHYL SALICYLATE	17
Glacial acetic acid	ACETIC ACID	17
GLUCITOL/GLYCEROL BLEND PROPOXYLATED (CONTAINING 10% OR MORE AMINES)		17
GLUCITOL/GLYCEROL BLEND PROPOXYLATED (CONTAINING LESS THAN 10% AMINES)		17
Glucitol solution	SORBITOL SOLUTION	18
D-Glucitol solution	SORBITOL SOLUTION	18
GLUCOSE SOLUTION		18
GLUTARALDEHYDE SOLUTIONS (50% OR LESS)		17
Glycerin	GLYCERINE	17
GLYCERINE		17
Glycerin triacetate	GLYCERYL TRIACETATE	17
Glyceritol	GLYCERINE	17
Glycerol	GLYCERINE	17
GLYCEROL ETHOXYLATED		18
GLYCEROL MONOOLEATE		17
Glycerol oleate	GLYCEROL MONOOLEATE	17
Glycerol 1-oleate	GLYCEROL MONOOLEATE	17
GLYCEROL PROPOXYLATED		17
GLYCEROL, PROPOXYLATED AND ETHOXYLATED		17

Index Name	Product Name	Chapter
GLYCEROL/SUCROSE BLEND PROPOXYLATED AND ETHOXYLATED		17
Glycerol triacetate	GLYCERYL TRIACETATE	17
GLYCERYL TRIACETATE		17
GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID		17
Glycidyl neodecanoate	GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID	17
GLYCINE, SODIUM SALT SOLUTION		17
Glycol	ETHYLENE GLYCOL	17
Glycol carbonate	ETHYLENE CARBONATE	17
Glycol chlorohydrin	ETHYLENE CHLOROHYDRIN	17
Glycol dichloride	ETHYLENE DICHLORIDE	17
GLYCOLIC ACID SOLUTION (70% OR LESS)		17
Glycol monobutyl ether (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
Glycols, polyethylene mono(p-nonylphenyl) ether (b)	ALKARYL POLYETHERS (C9-C20)	17
Glycyl alcohol	GLYCERINE	17
Glyoxaldehyde	GLYOXAL SOLUTION (40% OR LESS)	17
Glyoxalic acid	GLYOXYLIC ACID SOLUTION (50 % OR LESS)	17
GLYOXAL SOLUTION (40% OR LESS)		17
GLYOXYLIC ACID SOLUTION (50 % OR LESS)		17
Glyphosate	GLYPHOSATE SOLUTION (NOT CONTAINING SURFACTANT)	17
Glyphosate-mono(isopropylammonium)	GLYPHOSATE SOLUTION (NOT CONTAINING SURFACTANT)	17
GLYPHOSATE SOLUTION (NOT CONTAINING SURFACTANT)		17
Grain alcohol	ETHYL ALCOHOL	18
GRAPE SEED OIL		17
GROUNDNUT OIL		17
Hemimellitene (a)	TRIMETHYLBENZENE (ALL ISOMERS)	17
Hendecanoic acid	UNDECANOIC ACID	17
1-Hendecanol	UNDECYL ALCOHOL	17
cyclo-Heptamethylene	CYCLOHEPTANE	17
HEPTANE (ALL ISOMERS)		17
1-Heptanecarboxylic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
3-Heptanecarboxylic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
Heptanoic acid	N-HEPTANOIC ACID	17
N-HEPTANOIC ACID		17
HEPTANOL (ALL ISOMERS) (D)		17
2-Heptanone	METHYL AMYL KETONE	17
Heptan-2-one	METHYL AMYL KETONE	17
HEPTENE (ALL ISOMERS)		17
Heptoic acid	N-HEPTANOIC ACID	17
HEPTYL ACETATE		17
Heptyl alcohol, all isomers (a)	HEPTANOL (ALL ISOMERS) (D)	17
Heptylcarbinol (a)	OCTANOL (ALL ISOMERS)	17
Heptylene, mixed isomers	HEPTENE (ALL ISOMERS)	17

Index Name	Product Name	Chapter
Heptylic acid	N-HEPTANOIC ACID	17
n-Heptylic acid	N-HEPTANOIC ACID	17
1-Hexadecene	OLEFINS (C13+, ALL ISOMERS)	17
Hexadecyl and icosyl methacrylate mixture (a)	CETYL/EICOSYL METHACRYLATE MIXTURE	17
1-HEXADECYLNAPHTHALENE / 1,4-BIS(HEXADECYL)NAPHTHALENE MIXTURE		17
Hexadecyl naphthalene/dihexadecyl naphthalene mixture	1-HEXADECYLNAPHTHALENE / 1,4-BIS(HEXADECYL)NAPHTHALENE MIXTURE	17
Hexadecyl / octadecyl alcohol (a)	ALCOHOLS (C13+)	17
Hexaethylene glycol (a)	POLYETHYLENE GLYCOL	17
Hexafluorosilicate solution (20-30%)	FLUOROSILICIC ACID SOLUTION (20-30%)	17
Hexahydroaniline	CYCLOHEXYLAMINE	17
Hexahydro-1H-azepine	HEXAMETHYLENEIMINE	17
Hexahydrobenzene	CYCLOHEXANE	17
Hexahydro-l-H-azepine	HEXAMETHYLENEIMINE	17
Hexahydrophenol	CYCLOHEXANOL	17
Hexahydrotoluene	METHYLCYCLOHEXANE	17
Hexamethylene	CYCLOHEXANE	17
HEXAMETHYLENEDIAMINE (MOLTEN)		17
HEXAMETHYLENEDIAMINE ADIPATE (50% IN WATER)		17
HEXAMETHYLENEDIAMINE SOLUTION		17
1,6-Hexamethylenediamine solution	HEXAMETHYLENEDIAMINE SOLUTION	17
Hexamethylenediammonium adipate solution (50% solution)	HEXAMETHYLENEDIAMINE ADIPATE (50% IN WATER)	17
HEXAMETHYLENE DIISOCYANATE		17
Hexamethylene-1,6-diisocyanate	HEXAMETHYLENE DIISOCYANATE	17
HEXAMETHYLENE GLYCOL		17
HEXAMETHYLENEIMINE		17
HEXAMETHYLENETETRAMINE SOLUTIONS		17
Hexamine	HEXAMETHYLENETETRAMINE SOLUTIONS	17
Hexanaphthene	CYCLOHEXANE	17
1,6-Hexandiamine hexanedioate (1:1)	HEXAMETHYLENEDIAMINE ADIPATE (50% IN WATER)	17
HEXANE (ALL ISOMERS)		17
1,6-Hexanediamine	HEXAMETHYLENEDIAMINE (MOLTEN)	17
1,6-Hexanediamine solutions	HEXAMETHYLENEDIAMINE SOLUTION	17
Hexane-1,6-diamine solutions	HEXAMETHYLENEDIAMINE SOLUTION	17
Hexanedioic acid, bis(2-ethylhexyl) ester	DI-(2-ETHYLHEXYL) ADIPATE	17
1,6-Hexanediol	HEXAMETHYLENE GLYCOL	17
Hexane-1,6-diol	HEXAMETHYLENE GLYCOL	17
1,6-HEXANEDIOL, DISTILLATION OVERHEADS		17
n-Hexane	HEXANE (ALL ISOMERS)	17
HEXANOIC ACID		17
HEXANOL		17
Hexan-1-ol	HEXANOL	17
2-Hexanone	METHYL BUTYL KETONE	17
Hexan-2-one	METHYL BUTYL KETONE	17

Index Name	Product Name	Chapter
HEXENE (ALL ISOMERS)		17
1-Hexene (a)	HEXENE (ALL ISOMERS)	17
Hex-1-ene (a)	HEXENE (ALL ISOMERS)	17
2-Hexene (a)	HEXENE (ALL ISOMERS)	17
Hexone	METHYL ISOBUTYL KETONE	17
HEXYL ACETATE		17
sec-Hexyl acetate	METHYLAMYL ACETATE	17
Hexyl alcohol	HEXANOL	17
Hexylene (a)	HEXENE (ALL ISOMERS)	17
HEXYLENE GLYCOL		17
Hexyl ethanoate	HEXYL ACETATE	17
Highly-Reactive Polyisobutylene	POLY(4+)ISOBUTYLENE (MW>224)	17
Homopiperidine	HEXAMETHYLENEIMINE	17
HVO (Hydrotreated Vegetable Oil)	ALKANES (C10-C26), LINEAR AND BRANCHED, (FLASHPOINT >60°C)	17
HYDROCARBON WAX		17
HYDROCHLORIC ACID (*)		17
Hydrofluorosilic acid solution (20-30%)	FLUOROSILICIC ACID SOLUTION (20-30%)	17
Hydrofuran	TETRAHYDROFURAN	17
Hydrogenated maltose syrup	MALTITOL SOLUTION	18
Hydrogenated oligosaccharide	HYDROGENATED STARCH HYDROLYSATE	18
HYDROGENATED STARCH HYDROLYSATE		18
Hydrogencarboxylic acid	FORMIC ACID (85% OR LESS ACID)	17
Hydrogen chloride, aqueous	HYDROCHLORIC ACID (*)	17
HYDROGEN PEROXIDE SOLUTIONS (OVER 60% BUT NOT OVER 70% BY MASS)		17
HYDROGEN PEROXIDE SOLUTIONS (OVER 8% BUT NOT OVER 60% BY MASS)		17
Hydrogen sulphate	SULPHURIC ACID	17
alpha-Hydro-omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]	POLYPROPYLENE GLYCOL	17
Hydroxyacetic acid	GLYCOLIC ACID SOLUTION (70% OR LESS)	17
Hydroxybenzene	PHENOL	17
4-Hydroxybutanoic acid lactone	GAMMA-BUTYROLACTONE	17
4-Hydroxybutyric acid lactone	GAMMA-BUTYROLACTONE	17
gamma-Hydroxybutyric acid lactone	GAMMA-BUTYROLACTONE	17
Hydroxydimethylbenzenes	XYLENOL	17
Hydroxyethanoic acid	GLYCOLIC ACID SOLUTION (70% OR LESS)	17
2-Hydroxyethyl acetate	ETHYLENE GLYCOL ACETATE	17
2-HYDROXYETHYL ACRYLATE		17
beta-Hydroxyethyl acrylate	2-HYDROXYETHYL ACRYLATE	17
2-Hydroxyethylamine	ETHANOLAMINE	17
N-beta-Hydroxyethylethylenediamine	AMINOETHYL ETHANOLAMINE	17
N-(HYDROXYETHYL)ETHYLENEDIAMINETRIACETIC ACID, TRISODIUM SALT SOLUTION		17
beta-Hydroxyethyl phenyl ether	ETHYLENE GLYCOL PHENYL ETHER	17
2-Hydroxyethyl propenoate	2-HYDROXYETHYL ACRYLATE	17
2-Hydroxyethyl 2-propenoate	2-HYDROXYETHYL ACRYLATE	17
alpha-Hydroxyisobutyronitrile	ACETONE CYANOHYDRIN	17

Index Name	Product Name	Chapter
4-Hydroxy-2-keto-4-methylpentane	DIACETONE ALCOHOL	17
4-Hydroxy-4-methylpentanone-2	DIACETONE ALCOHOL	17
4-Hydroxy-4-methylpentan-2-one	DIACETONE ALCOHOL	17
2-Hydroxy-2-methylpropionitrile	ACETONE CYANOHYDRIN	17
2-HYDROXY-4-(METHYLTHIO)BUTANOIC ACID		17
2-Hydroxy-4-(methylthio)butyric acid	2-HYDROXY-4-(METHYLTHIO)BUTANOIC ACID	17
2-Hydroxynitrobenzene (molten)	O-NITROPHENOL (MOLTEN)	17
1-Hydroxy-2-phenoxyethane	ETHYLENE GLYCOL PHENYL ETHER	17
2-Hydroxypropanoic acid	LACTIC ACID	17
2-Hydroxypropionic acid	LACTIC ACID	17
alpha-Hydroxypropionic acid	LACTIC ACID	17
3-Hydroxypropionic acid, lactone.	BETA-PROPIOLACTONE	17
beta-Hydroxypropionitrile	ETHYLENE CYANOHYDRIN	17
2-Hydroxypropionitrile solution (80% or less)	LACTONITRILE SOLUTION (80% OR LESS)	17
alpha-Hydroxypropionitrile solution (80% or less)	LACTONITRILE SOLUTION (80% OR LESS)	17
3-Hydroxypropionitrile	ETHYLENE CYANOHYDRIN	17
2-Hydroxypropionitrile solution (80% or less)	LACTONITRILE SOLUTION (80% OR LESS)	17
2-[2-(2-hydroxypropoxy)propoxy]propan-1-ol	TRIPROPYLENE GLYCOL	17
2-Hydroxypropylamine	ISOPROPANOLAMINE	17
3-Hydroxypropylamine	N-PROPANOLAMINE	17
alpha-Hydroxytoluene	BENZYL ALCOHOL	17
3-Hydroxy-2,2,4-trimethylpentyl isobutyrate	2,2,4-TRIMETHYL-1,3-PENTANEDIOL-1-ISOBUTYRATE	17
ILLIPE OIL		17
2,2'-Iminodi(ethylamine)	DIETHYLENETRIAMINE	17
2,2'-Iminodiethanol	DIETHANOLAMINE	17
1,1'-Iminodipropan-2-ol	DIISOPROPANOLAMINE	17
Iron (III) chloride solutions	FERRIC CHLORIDE SOLUTIONS	17
Iron (III) nitrate / nitric acid solution	FERRIC NITRATE/NITRIC ACID SOLUTION	17
Isoacetophenone	ISOPHORONE	17
Isoamyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
ISOAMYL ALCOHOL		17
Isobutaldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
Isobutanal (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
Isobutanol	ISOBUTYL ALCOHOL	17
Isobutanolamine	2-AMINO-2-METHYL-1-PROPANOL	17
Isobutyl acetate	BUTYL ACETATE (ALL ISOMERS)	17
Isobutyl acrylate (a)	BUTYL ACRYLATE (ALL ISOMERS)	17
ISOBUTYL ALCOHOL		17
Isobutyl aldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
Isobutylamine (a)	BUTYLAMINE (ALL ISOMERS)	17
Isobutylcarbinol	ISOAMYL ALCOHOL	17
ISOBUTYL FORMATE		17
Isobutyl ketone	DIISOBUTYL KETONE	17
ISOBUTYL METHACRYLATE		17
Isobutylmethylcarbinol	METHYLAMYL ALCOHOL	17

Index Name	Product Name	Chapter
Isobutyl methyl ketone	METHYL ISOBUTYL KETONE	17
Isobutylmethylemethanol	METHYLAMYL ALCOHOL	17
Isobutyraldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
Isobutyric aldehyde (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
alpha-Isocyanatobenzyl-omega-isocyanatophenylpoly[(phenyl isocyanate)-alt-formaldehyde]	POLYMETHYLENE POLYPHENYL ISOCYANATE	17
3-Isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate	ISOPHORONE DIISOCYANATE	17
Isodecanol	DECYL ALCOHOL (ALL ISOMERS)	17
Isodecyl alcohol	DECYL ALCOHOL (ALL ISOMERS)	17
Isododecane (a)	DODECANE (ALL ISOMERS)	17
Isodurene (a)	TETRAMETHYLBENZENE (ALL ISOMERS)	17
Isononanoic acid	NONANOIC ACID (ALL ISOMERS)	17
Isononanol	NONYL ALCOHOL (ALL ISOMERS)	17
Isooctane (a)	OCTANE (ALL ISOMERS)	17
Isooctanol	OCTANOL (ALL ISOMERS)	17
Isopentane (a)	PENTANE (ALL ISOMERS)	17
Isopentanol	AMYL ALCOHOL, PRIMARY	17
Isopentanol	ISOAMYL ALCOHOL	17
Isopentyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
Isopentyl alcohol	ISOAMYL ALCOHOL	17
ISOPHORONE		17
ISOPHORONEDIAMINE		17
ISOPHORONE DIISOCYANATE		17
ISOPRENE		17
Isopropanol	ISOPROPYL ALCOHOL	18
ISOPROPANOLAMINE		17
Isopropenylbenzene	ALPHA-METHYLSTYRENE	17
2-Isopropoxyethanol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-Isopropoxypropane	ISOPROPYL ETHER	17
ISOPROPYL ACETATE		17
Isopropylacetone	METHYL ISOBUTYL KETONE	17
ISOPROPYL ALCOHOL		18
ISOPROPYLAMINE		17
ISOPROPYLAMINE (70% OR LESS) SOLUTION		17
Isopropylammonium N-(phosphonomethyl)glycine	GLYPHOSATE SOLUTION (NOT CONTAINING SURFACTANT)	17
Isopropylcarbinol	ISOBUTYL ALCOHOL	17
Isopropyl carbinol	ISOBUTYL ALCOHOL	17
ISOPROPYLCYCLOHEXANE		17
1-Isopropyl-2,2-dimethyltrimethylene diisobutyrate	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	17
ISOPROPYL ETHER		17
Isopropylideneacetone	MESITYL OXIDE	17
Isopropyl oxide	ISOPROPYL ETHER	17
4-Isopropyltoluene	P-CYMENE	17
p-Isopropyltoluene	P-CYMENE	17
4-Isopropyltoluol	P-CYMENE	17

Index Name	Product Name	Chapter
Isovaleral	VALERALDEHYDE (ALL ISOMERS)	17
Isovaleraldehyde	VALERALDEHYDE (ALL ISOMERS)	17
Isovaleric aldehyde	VALERALDEHYDE (ALL ISOMERS)	17
Isovalerone	DIISOBUTYL KETONE	17
JATROPHA OIL		17
Kaolin clay slurry	KAOLIN SLURRY	18
Kaolinite slurry	KAOLIN SLURRY	18
KAOLIN SLURRY		18
Ketohexamethylene	CYCLOHEXANONE	17
Ketone propane	ACETONE	18
Ketopropane	ACETONE	18
LACTIC ACID		17
LACTONITRILE SOLUTION (80% OR LESS)		17
LARD		17
LATEX, AMMONIA (1% OR LESS)- INHIBITED		17
LATEX: CARBOXYLATED STYRENE-BUTADIENE COPOLYMER; STYRENE-BUTADIENE RUBBER		17
LAURIC ACID		17
Lauryl alcohol	DODECYL ALCOHOL	17
Lead alkyls, n.o.s. (a)	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYLs)	17
Lead tetraethyl (a)	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYLs)	17
Lead tetramethyl (a)	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYLs)	17
LECITHIN		18
LIGNINSULPHONIC ACID, MAGNESIUM SALT SOLUTION		17
LIGNINSULPHONIC ACID, SODIUM SALT SOLUTION		17
Limonene	DIPENTENE	17
Linear alkylbenzene (LAB) bottoms (a)	ALKYLBENZENE DISTILLATION BOTTOMS	17
Linear alkyl(C12-C16) propoxyamine ethoxylate	ALKYL(C12-C16) PROPOXYAMINE ETHOXYLATE	17
LINSEED OIL		17
LIQUID CHEMICAL WASTES		17
Liquid paraffin	N-ALKANES (C10-C20)	17
LONG-CHAIN ALKARYL POLYETHER (C11-C20)		17
LONG-CHAIN ALKARYL SULPHONIC ACID (C16-C60)		17
LONG-CHAIN ALKYLPHENATE/PHENOL SULPHIDE MIXTURE		17
LONG-CHAIN ALKYLPHENOL (C14-C18)		17
LONG-CHAIN ALKYLPHENOL (C18-C30)		17
Lye, soda solution	SODIUM HYDROXIDE SOLUTION (*)	17
L-LYSINE SOLUTION (60% OR LESS)		17
Magnesia hydrate	MAGNESIUM HYDROXIDE SLURRY	17
MAGNESIUM CHLORIDE SOLUTION		17
MAGNESIUM HYDROXIDE SLURRY		17

Index Name	Product Name	Chapter
Magnesium Lignasulphonate solution	LIGNINSULPHONIC ACID, MAGNESIUM SALT SOLUTION	17
MAGNESIUM LONG-CHAIN ALKARYL SULPHONATE (C11-C50)		17
MAGNESIUM LONG-CHAIN ALKYL SALICYLATE (C11+)		17
MALEIC ANHYDRIDE		17
MALEIC ANHYDRIDE-SODIUM ALLYLSULPHONATE COPOLYMER SOLUTION		17
Maltitol	MALTITOL SOLUTION	18
MALTITOL SOLUTION		18
Maltitol syrup	MALTITOL SOLUTION	18
MANGO KERNEL OIL		17
Meglumine solution (70% or less)	N-METHYLGLUCAMINE SOLUTION (70% OR LESS)	17
MERCAPTOBENZOTHAZOL, SODIUM SALT SOLUTION		17
Mesitylene	TRIMETHYLBENZENE (ALL ISOMERS)	17
MESITYL OXIDE		17
Metaformaldehyde	1,3,5-TRIOXANE	17
Metam-sodium	METAM SODIUM SOLUTION	17
METAM SODIUM SOLUTION		17
METHACRYLIC ACID		17
METHACRYLIC ACID - ALKOXPOLY (ALKYLENE OXIDE) METHACRYLATE COPOLYMER, SODIUM SALT AQUEOUS SOLUTION (45% OR LESS)		17
alpha-Methacrylic acid	METHACRYLIC ACID	17
Methacrylic acid, dodecyl ester	DODECYL METHACRYLATE	17
Methacrylic acid, lauryl ester	DODECYL METHACRYLATE	17
METHACRYLIC RESIN IN ETHYLENE DICHLORIDE		17
METHACRYLONITRILE		17
Methanal	FORMALDEHYDE SOLUTIONS (45% OR LESS)	17
Methanamide	FORMAMIDE	17
Methanamine	METHYLAMINE SOLUTIONS (42% OR LESS)	17
Methanecarboxylic acid	ACETIC ACID	17
Methanoic acid	FORMIC ACID (85% OR LESS ACID)	17
Methanol	METHYL ALCOHOL (*)	17
Methenamine	HEXAMETHYLENETETRAMINE SOLUTIONS	17
3-METHOXY-1-BUTANOL		17
3-Methoxybutan-1-ol	3-METHOXY-1-BUTANOL	17
3-METHOXYBUTYL ACETATE		17
2-Methoxyethanol (a)	ETHYLENE GLYCOL MONOALKYL ETHERS	17
2-(2-Methoxyethoxy)ethanol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
2-[2-(2-Methoxyethoxy)ethoxy]ethanol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
2-(2-Methoxyethoxy)ethyl acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
2-Methoxyethyl acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE	17
2-Methoxy-2-methylbutane	TERT-AMYL METHYL ETHER	17

Index Name	Product Name	Chapter
3-Methoxy-3-methylbutan-1-ol	3-METHYL-3-METHOXYBUTANOL	17
2-Methoxy-1-methylethyl acetate	PROPYLENE GLYCOL METHYL ETHER ACETATE	17
N-(2-METHOXY-1-METHYL ETHYL)-2-ETHYL-6-METHYL CHLOROACETANILIDE		17
2-methoxy-2-methylpropane	METHYL TERT-BUTYL ETHER	17
1-Methoxypropan-2-ol (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
1-Methoxy-2-propanol acetate	PROPYLENE GLYCOL METHYL ETHER ACETATE	17
1-(2-Methoxypropoxy)propan-2-ol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
3-[3-(3-Methoxypropoxy)propoxy]propan-1-ol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Methoxytriglycol (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Methylacetaldehyde	PROPIONALDEHYDE	17
METHYL ACETATE		17
Methylacetic acid	PROPIONIC ACID	17
METHYL ACETOACETATE		17
Methyl acetylacetate	METHYL ACETOACETATE	17
beta-Methylacrolein	CROTONALDEHYDE	17
METHYL ACRYLATE		17
2-Methylacrylic acid	METHACRYLIC ACID	17
2-Methylacrylic acid, dodecyl ester	DODECYL METHACRYLATE	17
2-Methylacrylic acid, lauryl ester	DODECYL METHACRYLATE	17
METHYL ALCOHOL (*)		17
METHYLAMINE SOLUTIONS (42% OR LESS)		17
1-Methyl-2-aminobenzene	O-TOLUIDINE	17
2-Methyl-1-aminobenzene	O-TOLUIDINE	17
METHYLAMYL ACETATE		17
METHYLAMYL ALCOHOL		17
METHYL AMYL KETONE		17
Methyl n-amy ketone	METHYL AMYL KETONE	17
2-Methylaniline	O-TOLUIDINE	17
N-METHYLANILINE		17
o-Methylaniline	O-TOLUIDINE	17
2-Methylbenzenamine	O-TOLUIDINE	17
o-Methylbenzenamine	O-TOLUIDINE	17
Methylbenzene	TOLUENE	17
Methylbenzol	TOLUENE	17
ALPHA-METHYLBENZYL ALCOHOL WITH ACETOPHENONE (15% OR LESS)		17
2-Methyl-1,3-butadiene	ISOPRENE	17
3-Methyl-1,3-butadiene	ISOPRENE	17
2-Methylbutanal	VALERALDEHYDE (ALL ISOMERS)	17
3-Methylbutanal	VALERALDEHYDE (ALL ISOMERS)	17
2-Methylbutane (a)	PENTANE (ALL ISOMERS)	17
Methyl butanoate	METHYL BUTYRATE	17
2-Methyl-2-butanol	TERT-AMYL ALCOHOL	17

Index Name	Product Name	Chapter
2-Methylbutan-2-ol	TERT-AMYL ALCOHOL	17
2-Methyl-4-butanol	ISOAMYL ALCOHOL	17
3-Methyl-1-butanol	AMYL ALCOHOL, PRIMARY	17
3-Methylbutan-1-ol	AMYL ALCOHOL, PRIMARY	17
3-Methyl-1-butanol	ISOAMYL ALCOHOL	17
3-Methylbutan-1-ol	ISOAMYL ALCOHOL	17
3-Methylbutan-3-ol	TERT-AMYL ALCOHOL	17
3-Methylbut-1-ene (a)	PENTENE (ALL ISOMERS)	17
Methylbutenes (a)	PENTENE (ALL ISOMERS)	17
METHYLBUTENOL		17
1-Methylbutyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
2-Methyl-2-butyl alcohol	TERT-AMYL ALCOHOL	17
3-Methyl-1-butyl alcohol	ISOAMYL ALCOHOL	17
3-Methyl-3-butyl alcohol	TERT-AMYL ALCOHOL	17
METHYL TERT-BUTYL ETHER		17
METHYL BUTYL KETONE		17
METHYLBUTYNOL		17
2-Methyl-3-butyne-2-ol	2-METHYL-2-HYDROXY-3-BUTYNE	17
2-Methylbut-3-yn-2-ol	2-METHYL-2-HYDROXY-3-BUTYNE	17
2-Methylbut-3-yn-2-ol	METHYLBUTYNOL	17
2-Methyl-3-butyne-2-ol	METHYLBUTYNOL	17
2-Methylbutyraldehyde	VALERALDEHYDE (ALL ISOMERS)	17
3-Methylbutyraldehyde	VALERALDEHYDE (ALL ISOMERS)	17
METHYL BUTYRATE		17
Methyl 'carbitol' acetate (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE	17
Methyl 'cellosolve' acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE	17
Methylchloroform	1,1,1-TRICHLOROETHANE	17
Methyl cyanide	ACETONITRILE	17
METHYLCYCLOHEXANE		17
1-Methyl-1,3-cyclopentadiene	METHYLCYCLOPENTADIENE DIMER	17
METHYLCYCLOPENTADIENE DIMER		17
METHYLCYCLOPENTADIENYL MANGANESE TRICARBONYL		17
METHYL DIETHANOLAMINE		17
4-Methyl-1,3-dioxolan-2-one	PROPYLENE CARBONATE	17
Methyl disulphide	DIMETHYL DISULPHIDE	17
Methylenebis(4-isocyanatobenzene)	DIPHENYLMETHANE DIISOCYANATE	17
Methylenebis(4-phenyl isocyanate)	DIPHENYLMETHANE DIISOCYANATE	17
Methylenebis(4-phenylene isocyanate)	DIPHENYLMETHANE DIISOCYANATE	17
Methylenebis(p-phenylene isocyanate)	DIPHENYLMETHANE DIISOCYANATE	17
4,4'-Methylenebis(4-phenyl isocyanate)	DIPHENYLMETHANE DIISOCYANATE	17
Methylene bromide	DIBROMOMETHANE	17
Methylene chloride	DICHLOROMETHANE	17
4,4'-Methylenedi(phenyl isocyanate)	DIPHENYLMETHANE DIISOCYANATE	17
Methylene dichloride	DICHLOROMETHANE	17

Index Name	Product Name	Chapter
4,4'-Methylenediphenyl diisocyanate	DIPHENYLMETHANE DIISOCYANATE	17
Methylenedi-p-phenylene diisocyanate	DIPHENYLMETHANE DIISOCYANATE	17
2-Methylenepropionic acid	METHACRYLIC ACID	17
Methyl ethanoate	METHYL ACETATE	17
1-Methylethyl acetate	ISOPROPYL ACETATE	17
1-Methylethylamine	ISOPROPYLAMINE	17
2-METHYL-6-ETHYL ANILINE		17
Methylethylcarbinol	SEC-BUTYL ALCOHOL	18
Methylethylene glycol	PROPYLENE GLYCOL	18
Methylethylene oxide	PROPYLENE OXIDE	17
METHYL ETHYL KETONE		17
N-(1-Methylethyl)propan-2-amine	DIISOPROPYLAMINE	17
2-METHYL-5-ETHYL PYRIDINE		17
METHYL FORMATE		17
N-METHYLGLUCAMINE SOLUTION (70% OR LESS)		17
N-methyl-D-glucamine solution (70% or less)	N-METHYLGLUCAMINE SOLUTION (70% OR LESS)	17
2-METHYLGLUTARONITRILE WITH 2-ETHYLSUCCINONITRILE (12% OR LESS)		17
Methyl glycol	PROPYLENE GLYCOL	18
5-Methylheptan-3-one	ETHYL AMYL KETONE	17
5-Methyl-3-heptanone	ETHYL AMYL KETONE	17
Methylhexylcarbinol	OCTANOL (ALL ISOMERS)	17
Methyl 2-hydroxybenzoate	METHYL SALICYLATE	17
Methyl o-hydroxybenzoate	METHYL SALICYLATE	17
2-METHYL-2-HYDROXY-3-BUTYNE		17
2-Methyl-2-hydroxy-3-butyne	METHYLBUTYNOL	17
2,2'-(Methylimino)diethanol	METHYL DIETHANOLAMINE	17
N-Methyl-2,2'-iminodiethanol	METHYL DIETHANOLAMINE	17
Methyl isoamyl ketone	METHYL AMYL KETONE	17
Methyl isobutenyl ketone	MESITYL OXIDE	17
Methylisobutylcarbinol	METHYLAMYL ALCOHOL	17
Methylisobutylcarbinol acetate	METHYLAMYL ACETATE	17
METHYL ISOBUTYL KETONE		17
p-Methylisopropyl benzene	P-CYMENE	17
2-Methylactonitrile	ACETONE CYANOHYDRIN	17
methyl mercaptopropionaldehyde	3-(METHYLTHIO)PROPIONALDEHYDE	17
METHYL METHACRYLATE		17
Methyl methanoate	METHYL FORMATE	17
3-METHYL-3-METHOXYBUTANOL		17
Methyl alpha-methylacrylate	METHYL METHACRYLATE	17
7-Methyl-3-methylene-1,6-octadiene	MYRCENE	17
Methyl 2-methylprop-2-enoate	METHYL METHACRYLATE	17
METHYL NAPHTHALENE (MOLTEN)		17
alpha-Methylnaphthalene (molten) (a)	METHYL NAPHTHALENE (MOLTEN)	17
beta-Methylnaphthalene (molten) (a)	METHYL NAPHTHALENE (MOLTEN)	17

Index Name	Product Name	Chapter
(o- and p-) Methylnitrobenzene	O- OR P-NITROTOLUENES	17
8-Methylnonan-1-ol	DECYL ALCOHOL (ALL ISOMERS)	17
Methylolpropane	N-BUTYL ALCOHOL	18
alpha-Methyl-omega-methoxypoly(ethylene oxide)	POLYETHYLENE GLYCOL DIMETHYL ETHER	17
alpha-Methyl-omega-methoxypoly(oxy-1,2-ethanediyl)	POLYETHYLENE GLYCOL DIMETHYL ETHER	17
alpha-Methyl-omega-methoxypoly(oxyethylene)	POLYETHYLENE GLYCOL DIMETHYL ETHER	17
Methyloxirane	PROPYLENE OXIDE	17
2-Methyl-2,4-pentanediol	HEXYLENE GLYCOL	17
2-Methylpentane-2,4-diol	HEXYLENE GLYCOL	17
4-Methylpentanol-2	METHYLAMYL ALCOHOL	17
4-Methylpentan-2-ol	METHYLAMYL ALCOHOL	17
4-Methyl-2-pentanol acetate	METHYLAMYL ACETATE	17
4-Methyl-2-pentanone	METHYL ISOBUTYL KETONE	17
4-Methylpentan-2-one	METHYL ISOBUTYL KETONE	17
2-Methylpentene (a)	HEXENE (ALL ISOMERS)	17
2-Methylpent-1-ene (a)	HEXENE (ALL ISOMERS)	17
2-Methyl-1-pentene (a)	HEXENE (ALL ISOMERS)	17
4-Methyl-1-pentene (a)	HEXENE (ALL ISOMERS)	17
4-Methyl-3-penten-2-one	MESITYL OXIDE	17
4-Methylpent-3-en-2-one	MESITYL OXIDE	17
4-Methyl-2-pentyl acetate	METHYLAMYL ACETATE	17
Methylpentyl acetates	METHYLAMYL ACETATE	17
Methyl tert-pentyl ether	TERT-AMYL METHYL ETHER	17
Methyl pentyl ketone	METHYL AMYL KETONE	17
2-Methyl-m-phenylenediamine (a)	TOLUENEDIAMINE	17
4-Methyl-m-phenylenediamine (a)	TOLUENEDIAMINE	17
Methylphenylene diisocyanate	TOLUENE DIISOCYANATE	17
4-methyl-1,3-phenylene diisocyanate	TOLUENE DIISOCYANATE	17
4-Methyl-m-phenylene diisocyanate	TOLUENE DIISOCYANATE	17
2-Methyl-2-phenylpropane (a)	BUTYLBENZENE (ALL ISOMERS)	17
2-Methylpropanal (a)	BUTYRALDEHYDE (ALL ISOMERS)	17
2-METHYL-1,3-PROPANEDIOL		17
2-Methylpropan-1-ol	ISOBUTYL ALCOHOL	17
2-Methyl-1-propanol	ISOBUTYL ALCOHOL	17
2-Methylpropan-2-ol	TERT-BUTYL ALCOHOL	17
2-Methyl-2-propanol	TERT-BUTYL ALCOHOL	17
2-Methylprop-2-enenitrile	METHACRYLONITRILE	17
2-Methylpropenoic acid	METHACRYLIC ACID	17
alpha-Methylpropenoic acid	METHACRYLIC ACID	17
2-Methylprop-1-enyl methyl ketone	MESITYL OXIDE	17
2-Methylpropyl acrylate (a)	BUTYL ACRYLATE (ALL ISOMERS)	17
2-Methyl-1-propyl alcohol	ISOBUTYL ALCOHOL	17
2-Methyl-2-propyl alcohol	TERT-BUTYL ALCOHOL	17
Methylpropylcarbinol	SEC-AMYL ALCOHOL	17
2-Methylpropyl formate	ISOBUTYL FORMATE	17
METHYL PROPYL KETONE		17
2-METHYLPYRIDINE		17

Index Name	Product Name	Chapter
3-METHYLPYRIDINE		17
4-METHYLPYRIDINE		17
alpha-Methylpyridine	2-METHYLPYRIDINE	17
1-Methylpyrrolidin-2-one	N-METHYL-2-PYRROLIDONE	17
1-Methyl-2-pyrrolidinone	N-METHYL-2-PYRROLIDONE	17
N-Methylpyrrolidinone	N-METHYL-2-PYRROLIDONE	17
1-Methyl-2-pyrrolidone	N-METHYL-2-PYRROLIDONE	17
N-METHYL-2-PYRROLIDONE		17
METHYL SALICYLATE		17
Methyl soyate	SOYBEAN OIL FATTY ACID METHYL ESTER	17
Methylstyrene (all isomers)	VINYLTOLUENE	17
ALPHA-METHYLSTYRENE		17
3-(METHYLTHIO)PROPIONALDEHYDE		17
2-Methyltrimethylene glycol	2-METHYL-1,3-PROPANEDIOL	17
Metolachlor	N-(2-METHOXY-1-METHYL ETHYL)-2-ETHYL-6-METHYL CHLOROACETANILIDE	17
MICROSILICA SLURRY		18
Middle oil	CARBOLIC OIL	17
Milk acid	LACTIC ACID	17
Milk of magnesia	MAGNESIUM HYDROXIDE SLURRY	18
Mineral wax	HYDROCARBON WAX	17
Mixed aliphatic oxygenated hydrocarbons, primary aliphatic alcohols and aliphatic ethers: mol wt: >200 (a)	OXYGENATED ALIPHATIC HYDROCARBON MIXTURE	17
MOLASSES		18
MOLYBDENUM POLYSULPHIDE LONG CHAIN ALKYL DITHIOCARBAMIDE COMPLEX		17
Monochlorobenzene	CHLOROBENZENE	17
Monochlorobenzol	CHLOROBENZENE	17
Monoethanolamine	ETHANOLAMINE	17
Monoethylamine	ETHYLAMINE (*)	17
Monoethylamine solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)	17
Monoisopropanolamine	ISOPROPANOLAMINE	17
Monoisopropylamine	ISOPROPYLAMINE	17
Monomethylamine solutions, 42% or less	METHYLAMINE SOLUTIONS (42% OR LESS)	17
Monopropylamine	N-PROPYLAMINE	17
Monopropylene glycol	PROPYLENE GLYCOL	18
MORPHOLINE		17
MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYL)		17
Muriatic acid	HYDROCHLORIC ACID (*)	17
MYRCENE		17
Naphtha, coal tar	COAL TAR NAPHTHA SOLVENT	17
NAPHTHALENE (MOLTEN)		17
NAPHTHALENE CRUDE (MOLTEN)		17
NAPHTHALENESULPHONIC ACID-FORMALDEHYDE COPOLYMER, SODIUM SALT SOLUTION		17
Naphtha (petroleum), Light Steam-cracked Aromatics (a)	ALKYLBENZENE MIXTURES (CONTAINING AT LEAST 50% OF TOLUENE)	17

Index Name	Product Name	Chapter
Naphtha safety solvent	WHITE SPIRIT, LOW (15-20%) AROMATIC	17
NEODECANOIC ACID		17
Neodecanoic acid, 2,3-epoxypropyl ester	GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID	17
Neodecanoic acid, glycidyl ester	GLYCIDYL ESTER OF C10 TRIALKYLACETIC ACID	17
Neodecanoic acid vinyl ester	VINYL NEODECANOATE	17
Neopentane (a)	PENTANE (ALL ISOMERS)	17
Neopentanoic acid	TRIMETHYLACETIC ACID	17
Neopentylene glycol	2,2-DIMETHYLPROPANE-1,3-DIOL (MOLTEN OR SOLUTION)	17
NITRATING ACID (MIXTURE OF SULPHURIC AND NITRIC ACIDS)		17
NITRIC ACID (70% AND OVER)		17
NITRIC ACID (LESS THAN 70%)		17
Nitric acid, fuming (a)	NITRIC ACID (70% AND OVER)	17
Nitric acid, red fuming	NITRIC ACID (70% AND OVER)	17
NITRILOTRIACETIC ACID, TRISODIUM SALT SOLUTION		17
2,2',2''-Nitrilotriethanol	TRIETHANOLAMINE	17
Nitrilo-2,2',2''-triethanol	TRIETHANOLAMINE	17
1,1',1''-Nitrilotripropan-2-ol	TRIISOPROPANOLAMINE	17
1,1',1''-Nitrilotri-2-propanol	TRIISOPROPANOLAMINE	17
NITROBENZENE		17
Nitrobenzol	NITROBENZENE	17
o-Nitrochlorobenzene	O-CHLORONITROBENZENE	17
NITROETHANE		17
NITROETHANE(80%)/ NITROPROPANE(20%)		17
NITROETHANE, 1-NITROPROPANE (EACH 15% OR MORE) MIXTURE		17
ortho-Nitrophenol (molten)	O-NITROPHENOL (MOLTEN)	17
2-Nitrophenol (molten)	O-NITROPHENOL (MOLTEN)	17
O-NITROPHENOL (MOLTEN)		17
1- OR 2-NITROPROPANE		17
NITROPROPANE (60%)/NITROETHANE (40%) MIXTURE		17
2-Nitrotoluene (a)	O- OR P-NITROTOLUENES	17
4-Nitrotoluene (a)	O- OR P-NITROTOLUENES	17
o-Nitrotoluene (a)	O- OR P-NITROTOLUENES	17
p-Nitrotoluene (a)	O- OR P-NITROTOLUENES	17
O- OR P-NITROTOLUENES		17
NONANE (ALL ISOMERS)		17
1-Nonanecarboxylic acid	DECANOIC ACID	17
n-Nonane (a)	NONANE (ALL ISOMERS)	17
NONANOIC ACID (ALL ISOMERS)		17
Nonanols	NONYL ALCOHOL (ALL ISOMERS)	17
NON-EDIBLE INDUSTRIAL GRADE PALM OIL		17
NONENE (ALL ISOMERS)		17
NONYL ALCOHOL (ALL ISOMERS)		17

Index Name	Product Name	Chapter
Nonylcarbinol	DECYL ALCOHOL (ALL ISOMERS)	17
Nonylene (a)	NONENE (ALL ISOMERS)	17
Nonyl hydride (a)	NONANE (ALL ISOMERS)	17
NONYL METHACRYLATE MONOMER		17
NONYLPHENOL		17
NONYLPHENOL POLY(4+)ETHOXYLATE		17
alpha-4-Nonylphenyl-omega-hydroxypoly(oxyethylene) (b)	ALKARYL POLYETHERS (C9-C20)	17
Nopinene	BETA-PINENE	17
Nopinene	BETA-PINENE	17
NOXIOUS LIQUID, NF, (1) N.O.S. (TRADE NAME, CONTAINS) ST1, CAT. X		17
NOXIOUS LIQUID, F, (2) N.O.S. (TRADE NAME, CONTAINS) ST1, CAT. X		17
NOXIOUS LIQUID, NF, (3) N.O.S. (TRADE NAME, CONTAINS) ST2, CAT. X		17
NOXIOUS LIQUID, F, (4) N.O.S. (TRADE NAME, CONTAINS) ST2, CAT. X		17
NOXIOUS LIQUID, NF, (5) N.O.S. (TRADE NAME, CONTAINS) ST2, CAT. Y		17
NOXIOUS LIQUID, F, (6) N.O.S. (TRADE NAME, CONTAINS) ST2, CAT. Y		17
NOXIOUS LIQUID, NF, (7) N.O.S. (TRADE NAME, CONTAINS) ST3, CAT. Y		17
NOXIOUS LIQUID, F, (8) N.O.S. (TRADE NAME, CONTAINS) ST3, CAT. Y		17
NOXIOUS LIQUID, NF, (9) N.O.S. (TRADE NAME, CONTAINS) ST3, CAT. Z		17
NOXIOUS LIQUID, F, (10) N.O.S. (TRADE NAME, CONTAINS) ST3, CAT. Z		17
NOXIOUS LIQUID, (11) N.O.S. (TRADE NAME, CONTAINS) CAT. Z		18
NON NOXIOUS LIQUID, (12) N.O.S. (TRADE NAME, CONTAINS) CAT. OS		18
Octadecan-1-ol	ALCOHOLS (C14-C18), PRIMARY, LINEAR AND ESSENTIALLY LINEAR	17
1-Octadecanol	ALCOHOLS (C14-C18), PRIMARY, LINEAR AND ESSENTIALLY LINEAR	17
OCTAMETHYLCYCLOTETRASILOXANE		17
Octanal (a)	OCTYL ALDEHYDES	17
OCTANE (ALL ISOMERS)		17
1-Octanethiol	N-OCTYL MERCAPTAN	17
OCTANOIC ACID (ALL ISOMERS)		17
OCTANOL (ALL ISOMERS)		17
Octan-1-ol (a)	OCTANOL (ALL ISOMERS)	17
OCTENE (ALL ISOMERS)		17
Octic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
Octoic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
Octyl acetate	N-OCTYL ACETATE	17
N-OCTYL ACETATE		17
Octyl acrylate	2-ETHYLHEXYL ACRYLATE	17
Octyl adipate	DI-(2-ETHYLHEXYL) ADIPATE	17
Octyl alcohol (a)	OCTANOL (ALL ISOMERS)	17

Index Name	Product Name	Chapter
OCTYL ALDEHYDES		17
Octylcarbinol	NONYL ALCOHOL (ALL ISOMERS)	17
OCTYL DECYL ADIPATE		17
Octyl decyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
Octylic acid (a)	OCTANOIC ACID (ALL ISOMERS)	17
N-OCTYL MERCAPTAN		17
Octyl nitrate	ALKYL (C7-C9) NITRATES	17
Octyl nitrates (all isomers)	ALKYL (C7-C9) NITRATES	17
Octyl phthalate (a)	DIALKYL (C7-C13) PHTHALATES	17
Oenanthic acid	N-HEPTANOIC ACID	17
Oenanthylic acid	N-HEPTANOIC ACID	17
OFFSHORE CONTAMINATED BULK LIQUID P*		17
OFFSHORE CONTAMINATED BULK LIQUID S*		17
Oil of Mirbane	NITROBENZENE	17
Oil of Myrbane	NITROBENZENE	17
Oil of turpentine	TURPENTINE	17
Oil of vitriol	SULPHURIC ACID	17
Oil of wintergreen	METHYL SALICYLATE	17
Oleamine	OLEYLAMINE	17
OLEFIN-ALKYL ESTER COPOLYMER (MOLECULAR WEIGHT 2000+)		17
OLEFIN MIXTURE (C7-C9) C8 RICH, STABILIZED		17
OLEFIN MIXTURES (C5-C7)		17
OLEFIN MIXTURES (C5-C15)		17
OLEFINS (C13+, ALL ISOMERS)		17
ALPHA-OLEFINS (C6-C18) MIXTURES		17
OLEIC ACID		17
OLEUM		17
OLEYLAMINE		17
OLIVE OIL		17
ORANGE JUICE (CONCENTRATED)		18
ORANGE JUICE (NOT CONCENTRATED)		18
Orthophosphoric acid	PHOSPHORIC ACID	17
Oxal	GLYOXAL SOLUTION (40% OR LESS)	17
Oxalaldehyde	GLYOXAL SOLUTION (40% OR LESS)	17
3-Oxapentane-1,5-diol	DIETHYLENE GLYCOL	17
1,4-Oxazinane	MORPHOLINE	17
2-Oxetanone	BETA-PROPIOLACTONE	17
Oxoacetic acid	GLYOXYLIC ACID SOLUTION (50 % OR LESS)	17
Oxoethanoic acid	GLYOXYLIC ACID SOLUTION (50 % OR LESS)	17
2,2'-Oxybis(1-chloropropane)	2,2'-DICHLOROISOPROPYL ETHER	17
2,2'-Oxybis(ethyleneoxy)diethanol	TETRAETHYLENE GLYCOL	17
2,2'-Oxybispropane	ISOPROPYL ETHER	17
2,2'-Oxydiethanol	DIETHYLENE GLYCOL	17

Index Name	Product Name	Chapter
1,1'-Oxydipropyl-2-ol	DIPROPYLENE GLYCOL	17
OXYGENATED ALIPHATIC HYDROCARBON MIXTURE		17
Oxymethylene	FORMALDEHYDE SOLUTIONS (45% OR LESS)	17
PALM ACID OIL		17
PALM FATTY ACID DISTILLATE		17
PALM KERNEL ACID OIL		17
PALM KERNEL FATTY ACID DISTILLATE		17
PALM KERNEL OIL		17
PALM KERNEL OLEIN		17
PALM KERNEL STEARIN		17
PALM MID-FRACTION		17
PALM OIL		17
PALM OIL FATTY ACID METHYL ESTER		17
PALM OLEIN		17
PALM STEARIN		17
Paraffin	HYDROCARBON WAX	17
C9-C11 n-Paraffin	N-ALKANES (C9-C11)	17
Paraffin, food grade	PARAFFIN WAX, HIGHLY-REFINED	17
n-Paraffin (C9-C11)	N-ALKANES (C9-C11)	17
n-Paraffins (C10-C20) (a)	N-ALKANES (C10-C20)	17
Paraffin wax	HYDROCARBON WAX	17
Paraffin wax, cosmetic	PARAFFIN WAX, HIGHLY-REFINED	17
Paraffin wax feedstock	PARAFFIN WAX, SEMI-REFINED	17
PARAFFIN WAX, HIGHLY-REFINED		17
PARAFFIN WAX, SEMI-REFINED		17
Paraffin wax, technical	PARAFFIN WAX, SEMI-REFINED	17
PARALDEHYDE		17
PARALDEHYDE-AMMONIA REACTION PRODUCT		17
Petrolatum	HYDROCARBON WAX	17
Pelargonic acid	NONANOIC ACID (ALL ISOMERS)	17
Pelargonic alcohol	NONYL ALCOHOL (ALL ISOMERS)	17
PENTACHLOROETHANE		17
Pentadecanol (a)	ALCOHOLS (C13+)	17
1-Pentadecene	OLEFINS (C13+, ALL ISOMERS)	17
Pentadec-1-ene (a)	OLEFINS (C13+, ALL ISOMERS)	17
1,3-PENTADIENE		17
Penta-1,3-diene	1,3-PENTADIENE	17
1,3-PENTADIENE (GREATER THAN 50%), CYCLOPENTENE AND ISOMERS, MIXTURES		17
Pentaethylene glycol (a)	POLYETHYLENE GLYCOL	17
PENTAETHYLENEHEXAMINE		17
Pentalin	PENTACHLOROETHANE	17
Pentamethylene	CYCLOPENTANE	17
Pentanal	VALERALDEHYDE (ALL ISOMERS)	17

Index Name	Product Name	Chapter
Pentane (a)	PENTANE (ALL ISOMERS)	17
PENTANE (ALL ISOMERS)		17
Pentanedial solutions, 50% or less	GLUTARALDEHYDE SOLUTIONS (50% OR LESS)	17
n-Pentane (a)	PENTANE (ALL ISOMERS)	17
PENTANOIC ACID		17
N-PENTANOIC ACID (64%)/2-METHYL BUTYRIC ACID (36%) MIXTURE		17
tert-Pentanoic acid	TRIMETHYLACETIC ACID	17
1-Pentanol	N-AMYL ALCOHOL	17
Pentan-1-ol	N-AMYL ALCOHOL	17
2-Pentanol	SEC-AMYL ALCOHOL	17
Pentan-2-ol	SEC-AMYL ALCOHOL	17
3-Pentanol	SEC-AMYL ALCOHOL	17
Pentan-3-ol	SEC-AMYL ALCOHOL	17
1-Pentanol acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
n-Pentanol	N-AMYL ALCOHOL	17
sec-Pentanol	SEC-AMYL ALCOHOL	17
tert-Pentanol	TERT-AMYL ALCOHOL	17
2-Pentanone	METHYL PROPYL KETONE	17
Pentan-2-one	METHYL PROPYL KETONE	17
Pentasodium diethylenetriaminepentaacetate solution	DIETHYLENTRIAMINEPENTAACETIC ACID, PENTASODIUM SALT SOLUTION	17
PENTENE (ALL ISOMERS)		17
Pent-1-ene (a)	PENTENE (ALL ISOMERS)	17
n-Pentene (a)	PENTENE (ALL ISOMERS)	17
Pentenes	PENTENE (ALL ISOMERS)	17
Pentyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
sec-Pentyl acetate (a)	AMYL ACETATE (ALL ISOMERS)	17
Pentyl alcohol	N-AMYL ALCOHOL	17
sec-Pentyl alcohol	SEC-AMYL ALCOHOL	17
tert-Pentyl alcohol	TERT-AMYL ALCOHOL	17
Pentyl propanoate	N-PENTYL PROPIONATE	17
N-PENTYL PROPIONATE		17
PERCHLOROETHYLENE		17
Perchloromethane	CARBON TETRACHLORIDE	17
Perhydroazepine	HEXAMETHYLENEIMINE	17
Petrolatum, highly-refined	PARAFFIN WAX, HIGHLY-REFINED	17
Petrolatum, industrial grade	PARAFFIN WAX, SEMI-REFINED	17
Petrolatum, USP-grade	PARAFFIN WAX, HIGHLY-REFINED	17
Petroleum jelly, technical	PARAFFIN WAX, SEMI-REFINED	17
Phene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Phenic acid	PHENOL	17
PHENOL		17
2-Phenoxyethanol	ETHYLENE GLYCOL PHENYL ETHER	17
Phenyl alkane(C10-C21)sulphonate (a)	ALKYL SULPHONIC ACID ESTER OF PHENOL	17

Index Name	Product Name	Chapter
Phenylamine	ANILINE	17
N-Phenylaniline	DIPHENYLAMINE (MOLTEN)	17
N-Phenylbenzenamine	DIPHENYLAMINE (MOLTEN)	17
1-Phenylbutane (a)	BUTYLBENZENE (ALL ISOMERS)	17
2-Phenylbutane (a)	BUTYLBENZENE (ALL ISOMERS)	17
Phenyl carbinol	BENZYL ALCOHOL	17
Phenyl 'cellosolve'	ETHYLENE GLYCOL PHENYL ETHER	17
Phenyl chloride	CHLOROBENZENE	17
1-Phenyldecane (b)	ALKYL(C9+)BENZENES	17
1-Phenyldecane	ALKYL(C9+)BENZENES	17
Phenylethane	ETHYLBENZENE	17
Phenyl ether	DIPHENYL ETHER	17
Phenylethylene	STYRENE MONOMER	17
1-(Phenylethyl)xylene	1-PHENYL-1-XYLYL ETHANE	17
Phenyl hydride	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Phenyl hydroxide	PHENOL	17
Phenylic acid	PHENOL	17
Phenylmethane	TOLUENE	17
Phenylmethanol	BENZYL ALCOHOL	17
Phenylmethyl acetate	BENZYL ACETATE	17
1-Phenylpropane (a)	PROPYLBENZENE (ALL ISOMERS)	17
2-Phenylpropane (a)	PROPYLBENZENE (ALL ISOMERS)	17
2-Phenylpropene	ALPHA-METHYLSTYRENE	17
1-Phenyltetradecane	ALKYL(C9+)BENZENES	17
1-Phenyltridecane	ALKYL(C9+)BENZENES	17
1-Phenylundecane	ALKYL(C9+)BENZENES	17
Phenylxylylethane	1-PHENYL-1-XYLYL ETHANE	17
1-PHENYL-1-XYLYL ETHANE		17
1-Phenyl-1-(2,5-xylyl)ethane (a)	1-PHENYL-1-XYLYL ETHANE	17
1-Phenyl-1-(3,4-xylyl)ethane (a)	1-PHENYL-1-XYLYL ETHANE	17
PHOSPHATE ESTERS, ALKYL (C12-C14) AMINE		17
L-alpha-Phosphatidyl choline	LECITHIN	18
N-(phosphonomethyl)glycine	GLYPHOSATE SOLUTION (NOT CONTAINING SURFACTANT)	17
PHOSPHORIC ACID		17
PHOSPHORUS, YELLOW OR WHITE (*)		17
Phthalandione (molten)	PHTHALIC ANHYDRIDE (MOLTEN)	17
Phthalic acid anhydride (molten)	PHTHALIC ANHYDRIDE (MOLTEN)	17
Phthalic acid, diundecyl ester	DIUNDECYL PHTHALATE	17
PHTHALIC ANHYDRIDE (MOLTEN)		17
2-Picoline	2-METHYLPYRIDINE	17
3-Picoline	3-METHYLPYRIDINE	17
4-Picoline	4-METHYLPYRIDINE	17
alpha-Picoline	2-METHYLPYRIDINE	17
beta-Picoline	3-METHYLPYRIDINE	17
gamma-Picoline	4-METHYLPYRIDINE	17

Index Name	Product Name	Chapter
Pimelic ketone	CYCLOHEXANONE	17
2-Pinene	ALPHA-PINENE	17
2(10)-Pinene	BETA-PINENE	17
ALPHA-PINENE		17
BETA-PINENE		17
PINE OIL		17
PIPERAZINE, 68% SOLUTION		17
2-Piperazin-1-ylethylamine	N-AMINOETHYLPIPERAZINE	17
Piperylene	1,3-PENTADIENE	17
Piperylene concentrates (Mixed)	1,3-PENTADIENE (GREATER THAN 50%), CYCLOPENTENE AND ISOMERS, MIXTURES	17
Pivalic acid	TRIMETHYLACETIC ACID	17
Poly(oxyethylene)	POLYETHER (MOLECULAR WEIGHT 1350+)	17
Poly(oxyethyleneoxyethyleneoxyphthaloyl)	DIETHYLENE GLYCOL PHTHALATE	17
Poly(sodium carboxylatoethylene)	SODIUM POLY(4+)ACRYLATE SOLUTIONS	17
POLYACRYLIC ACID SOLUTION (40% OR LESS)		17
POLYALKYL (C18-C22) ACRYLATE IN XYLENE		17
POLYALKYLALKENAMINESUCCINIMIDE, MOLYBDENUM OXYSULPHIDE		17
POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER		17
POLY(2-8)ALKYLENE GLYCOL MONOALKYL (C1-C6) ETHER ACETATE		17
Poly (2-8) alkylene (C2-C3) glycols / Polyalkylene (C2-C10) glycol monoalkyl (C1-C4) ethers and their borate esters (a)	BRAKE FLUID BASE MIX: POLY(2-8)ALKYLENE (C2-C3) GLYCOLS/POLYALKYLENE (C2-C10) GLYCOLS MONOALKYL (C1-C4) ETHERS AND THEIR BORATE ESTERS	17
POLYALKYL (C10-C20) METHACRYLATE		17
POLYALKYL (C10-C18) METHACRYLATE/ETHYLENE-PROPYLENE COPOLYMER MIXTURE		17
POLYALUMINIUM CHLORIDE SOLUTION		17
POLYBUTENE		17
POLYBUTENYL SUCCINIMIDE		17
POLY(2+)CYCLIC AROMATICS		17
POLYETHER (MOLECULAR WEIGHT 1350+)		17
POLYETHYLENE GLYCOL		17
Poly(4-12)ethylene glycol alkyl(C7-C11)phenyl ether	NONYLPHENOL POLY(4+)ETHOXYLATE	17
POLYETHYLENE GLYCOL DIMETHYL ETHER		17
POLY(ETHYLENE GLYCOL) METHYLBUTENYL ETHER (MW>1000)		17
Polyethylene glycols, mono(p-nonylphenyl) ether (b)	ALKARYL POLYETHERS (C9-C20)	17
Poly(ethylene oxide) (molecular weight 1350+) (a)	POLYETHER (MOLECULAR WEIGHT 1350+)	17
POLYETHYLENE POLYAMINES		17
POLYETHYLENE POLYAMINES (MORE THAN 50% C5 -C20 PARAFFIN OIL)		17
POLYFERRIC SULPHATE SOLUTION		17
Polyglucitol	HYDROGENATED STARCH HYDROLYSATE	18
POLYGLYCERIN, SODIUM SALT SOLUTION (CONTAINING LESS THAN 3% SODIUM HYDROXIDE)		17

Index Name	Product Name	Chapter
Polyglycitol syrup	HYDROGENATED STARCH HYDROLYSATE	18
POLY(IMINOETHYLENE)-GRAFT-N-POLY(ETHYLENEOXY) SOLUTION (90% OR LESS)		17
POLYISOBUTENAMINE IN ALIPHATIC (C10-C14) SOLVENT		17
(POLYISOBUTENE) AMINO PRODUCTS IN ALIPHATIC HYDROCARBONS		17
POLYISOBUTENYL ANHYDRIDE ADDUCT		17
POLY(4+)ISOBUTYLENE (MW>224)		17
POLYISOBUTYLENE (MW≤224)		17
POLYMETHYLENE POLYPHENYL ISOCYANATE		17
POLYOLEFIN (MOLECULAR WEIGHT 300+)		17
POLYOLEFIN AMIDE ALKENEAMINE (C17+)		17
POLYOLEFIN AMIDE ALKENEAMINE BORATE (C28-C250)		17
POLYOLEFIN AMIDE ALKENEAMINE POLYOL		17
POLYOLEFINAMINE (C28-C250)		17
POLYOLEFINAMINE IN ALKYL (C2-C4) BENZENES		17
POLYOLEFINAMINE IN AROMATIC SOLVENT		17
POLYOLEFIN AMINOESTER SALTS (MOLECULAR WEIGHT 2000+)		17
POLYOLEFIN ANHYDRIDE		17
POLYOLEFIN ESTER (C28-C250)		17
POLYOLEFIN PHENOLIC AMINE (C28-C250)		17
POLYOLEFIN PHOSPHOROSULPHIDE, BARIUM DERIVATIVE (C28-C250)		17
Poly(oxyalkylene)alkenyl ether (MW>1000)	POLY(ETHYLENE GLYCOL) METHYL BUTENYL ETHER (MW>1000)	17
Poly(oxy-1,2-ethanediy), alpha-(3-methyl-3-butenyl)-, omega-hydroxy-	POLY(ETHYLENE GLYCOL) METHYL BUTENYL ETHER (MW>1000)	17
POLY(20)OXYETHYLENE SORBITAN MONOOLEATE		17
Poly(oxypropylene) (molecular weight 1350+) (a)	POLYETHER (MOLECULAR WEIGHT 1350+)	17
poly[(phenyl isocyanate)-alt-formaldehyde] (a)	POLYMETHYLENE POLYPHENYL ISOCYANATE	17
Poly[(phenyl isocyanate)-co-formaldehyde] (a)	POLYMETHYLENE POLYPHENYL ISOCYANATE	17
Poly[propene oxide]	POLYETHER (MOLECULAR WEIGHT 1350+)	17
Polypropylene	POLY(5+)PROPYLENE	17
POLY(5+)PROPYLENE		17
POLYPROPYLENE GLYCOL		17
POLYSILOXANE		17
Potash lye solution	POTASSIUM HYDROXIDE SOLUTION (*)	17
Potassium chloride brine (<26%)	POTASSIUM CHLORIDE SOLUTION (LESS THAN 26%)	18
Potassium chloride drilling brine	POTASSIUM CHLORIDE SOLUTION	17
POTASSIUM CHLORIDE SOLUTION		17
POTASSIUM CHLORIDE SOLUTION (LESS THAN 26%)		18
POTASSIUM FORMATE SOLUTIONS (*)		17
POTASSIUM HYDROXIDE SOLUTION (*)		17

Index Name	Product Name	Chapter
POTASSIUM OLEATE		17
POTASSIUM THIOSULPHATE (50% OR LESS)		17
Propanal	PROPIONALDEHYDE	17
Propan-1-amine	N-PROPYLAMINE	17
2-Propanamine	ISOPROPYLAMINE	17
1,2-Propanediol	PROPYLENE GLYCOL	18
Propane-1,2-diol	PROPYLENE GLYCOL	18
1,2-Propanediol cyclic carbonate	PROPYLENE CARBONATE	17
Propanenitrile	PROPIONITRILE	17
1,2,3-Propanetriol	GLYCERINE	17
Propane-1,2,3-triol	GLYCERINE	17
1,2,3-Propanetriol triacetate	GLYCERYL TRIACETATE	17
Propanoic acid	PROPIONIC ACID	17
Propanoic anhydride	PROPIONIC ANHYDRIDE	17
Propanol	N-PROPYL ALCOHOL	17
1-Propanol	N-PROPYL ALCOHOL	17
Propan-1-ol	N-PROPYL ALCOHOL	17
2-Propanol	ISOPROPYL ALCOHOL	18
Propan-2-ol	ISOPROPYL ALCOHOL	18
N-PROPANOLAMINE		17
3-Propanolide	BETA-PROPIOLACTONE	17
n-Propanol	N-PROPYL ALCOHOL	17
Propanone	ACETONE	18
2-Propanone	ACETONE	18
Propan-2-one	ACETONE	18
Propenamide solution, 50% or less	ACRYLAMIDE SOLUTION (50% OR LESS)	17
2-PROPENE-1-AMINIUM, N,N-DIMETHYL-N-2-PROPENYL-, CHLORIDE, HOMOPOLYMER SOLUTION		17
Propenenitrile	ACRYLONITRILE	17
Propene oxide	PROPYLENE OXIDE	17
Propenoic acid	ACRYLIC ACID	17
2-Propenoic acid, homopolymer solution (40% or less)	POLYACRYLIC ACID SOLUTION (40% OR LESS)	17
1-Propenol-3	ALLYL ALCOHOL	17
2-Propen-1-ol	ALLYL ALCOHOL	17
Prop-2-en-1-ol	ALLYL ALCOHOL	17
Propenyl alcohol	ALLYL ALCOHOL	17
Propiolactone	BETA-PROPIOLACTONE	17
BETA-PROPIOLACTONE		17
PROPIONALDEHYDE		17
PROPIONIC ACID		17
Propionic aldehyde	PROPIONALDEHYDE	17
PROPIONIC ANHYDRIDE		17
PROPIONITRILE		17
beta-Propionolactone	BETA-PROPIOLACTONE	17
Propionitrile	PROPIONITRILE	17
Propionyl oxide	PROPIONIC ANHYDRIDE	17

Index Name	Product Name	Chapter
1-Propoxypropan-2-ol (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propyl acetate	N-PROPYL ACETATE	17
N-PROPYL ACETATE		17
Propyl acetone	METHYL BUTYL KETONE	17
Propyl alcohol	N-PROPYL ALCOHOL	17
2-Propyl alcohol	ISOPROPYL ALCOHOL	18
N-PROPYL ALCOHOL		17
sec-Propyl alcohol	ISOPROPYL ALCOHOL	18
Propyl aldehyde	PROPIONALDEHYDE	17
Propylamine	N-PROPYLAMINE	17
N-PROPYLAMINE		17
PROPYLBENZENE (ALL ISOMERS)		17
n-Propylbenzene (a)	PROPYLBENZENE (ALL ISOMERS)	17
Propylcarbinol	N-BUTYL ALCOHOL	18
Propylene aldehyde	CROTONALDEHYDE	17
2,2'-[Propylenebis(nitrilomethylene)]diphenol in aromatic solvent	ALKYL (C8-C9) PHENYLAMINE IN AROMATIC SOLVENTS	17
PROPYLENE CARBONATE		17
Propylene chloride	1,2-DICHLOROPROPANE	17
Propylene dichloride	1,2-DICHLOROPROPANE	17
alpha,alpha'- (Propylenedinitrilo)di-o-cresol in aromatic solvent	ALKYL (C8-C9) PHENYLAMINE IN AROMATIC SOLVENTS	17
Propylene epoxide	PROPYLENE OXIDE	17
PROPYLENE GLYCOL		18
1,2-Propylene glycol	PROPYLENE GLYCOL	18
Propylene glycol n-butyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propylene glycol ethyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propylene glycol methyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
PROPYLENE GLYCOL METHYL ETHER ACETATE		17
PROPYLENE GLYCOL MONOALKYL ETHER		17
Propylene glycol monobutyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propylene glycol beta-monoethyl ether	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propylene glycol monomethyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
PROPYLENE GLYCOL PHENYL ETHER		17
Propylene glycol propyl ether (a)	PROPYLENE GLYCOL MONOALKYL ETHER	17
Propylene glycol trimer	TRIPROPYLENE GLYCOL	17
1,2-Propylene glycol trimer	TRIPROPYLENE GLYCOL	17
PROPYLENE OXIDE		17
PROPYLENE TETRAMER		17
PROPYLENE TRIMER		17
Propylethylene (a)	PENTENE (ALL ISOMERS)	17
Propyl methyl ketone	METHYL PROPYL KETONE	17
N-Propyl-1-propanamine	DI-N-PROPYLAMINE	17
Pseudobutylene glycol	BUTYLENE GLYCOL	17
Pseudocumene	TRIMETHYLBENZENE (ALL ISOMERS)	17
Pseudopinen	BETA-PINENE	17

Index Name	Product Name	Chapter
Psuedopinene	BETA-PINENE	17
Pygas	PYROLYSIS GASOLINE (CONTAINING BENZENE)	17
PYRIDINE		17
Pyroacetic acid	ACETONE	18
Pyroacetic ether	ACETONE	18
PYROLYSIS GASOLINE (CONTAINING BENZENE)		17
Pyrolysis gasoline (steam-cracked naphtha)	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Pyrolysis gasoline, containing 10% or more benzene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE (I)	17
Pyromucic aldehyde	FURFURAL	17
RAPSEED OIL		17
RAPSEED OIL (LOW ERUCIC ACID CONTAINING LESS THAN 4% FREE FATTY ACIDS)		17
RAPE SEED OIL FATTY ACID METHYL ESTERS		17
Refined, bleached, deodorised grape seed oil (RBD)	GRAPE SEED OIL	17
RESIN OIL, DISTILLED		17
RICE BRAN OIL		17
ROSIN		17
SAFFLOWER OIL		17
Saturated fatty acid (C13 and above) (a)	FATTY ACID (SATURATED C13+)	17
SHEA BUTTER		17
Silicofluoric acid solution (20-30%)	FLUOROSILICIC ACID SOLUTION (20-30%)	17
Slack wax	HYDROCARBON WAX	17
Sludge acid	SULPHURIC ACID, SPENT	17
SME	SOYBEAN OIL FATTY ACID METHYL ESTER	17
Soda ash solution	SODIUM CARBONATE SOLUTION (*)	17
Soda lye solution	SODIUM HYDROXIDE SOLUTION (*)	17
SODIUM ACETATE SOLUTIONS		18
Sodium acid sulphite solution (45% or less)	SODIUM HYDROGEN SULPHITE SOLUTION (45% OR LESS)	17
Sodium alkylbenzene sulphonate solution	ALKYLBENZENE SULPHONIC ACID, SODIUM SALT SOLUTION	17
SODIUM ALKYL (C14-C17) SULPHONATES (60-65% SOLUTION)		17
SODIUM ALUMINOSILICATE SLURRY		17
Sodium aminoacetate solution	GLYCINE, SODIUM SALT SOLUTION	17
SODIUM BENZOATE		17
Sodium 1,3-benzothiazole-2-thiolate solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	17
Sodium 1,3-benzothiazol-2-yl sulphide solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	17
SODIUM BICARBONATE SOLUTION (LESS THAN 10%)		18
Sodium bichromate solution (70% or less)	SODIUM DICHROMATE SOLUTION (70% OR LESS)	17
Sodium bisulphide solution (45% or less)	SODIUM HYDROSULPHIDE SOLUTION (45% OR LESS) (*)	17
SODIUM BOROHYDRIDE (15% OR LESS)/SODIUM HYDROXIDE SOLUTION (*)		17

Index Name	Product Name	Chapter
SODIUM BROMIDE SOLUTION (LESS THAN 50%) (*)		17
SODIUM CARBONATE SOLUTION (*)		17
Sodium carboxylate solution	CYCLOHEXANE OXIDATION PRODUCTS, SODIUM SALTS SOLUTION	17
SODIUM CHLORATE SOLUTION (50% OR LESS) (*)		17
Sodium cresylate solution	CRESYLIC ACID, SODIUM SALT SOLUTION	17
SODIUM DICHROMATE SOLUTION (70% OR LESS)		17
Sodium glycinate solution	GLYCINE, SODIUM SALT SOLUTION	17
Sodium hydrate solution	SODIUM HYDROXIDE SOLUTION (*)	17
SODIUM HYDROGEN SULPHIDE (6% OR LESS)/SODIUM CARBONATE (3% OR LESS) SOLUTION		17
Sodium hydrogensulphide solution (45% or less)	SODIUM HYDROSULPHIDE SOLUTION (45% OR LESS) (*)	17
SODIUM HYDROGEN SULPHITE SOLUTION (45% OR LESS)		17
SODIUM HYDROSULPHIDE/AMMONIUM SULPHIDE SOLUTION (*)		17
SODIUM HYDROSULPHIDE SOLUTION (45% OR LESS) (*)		17
SODIUM HYDROXIDE SOLUTION (*)		17
SODIUM HYPOCHLORITE SOLUTION (15% OR LESS)		17
Sodium lignosulphonate	LIGNINSULPHONIC ACID, SODIUM SALT SOLUTION	17
Sodium methanolate	SODIUM METHYLATE 21-30% IN METHYL ALCOHOL	17
Sodium methoxide	SODIUM METHYLATE 21-30% IN METHYL ALCOHOL	17
SODIUM METHYLATE 21-30% IN METHYL ALCOHOL		17
Sodium methylcarbamdithioate	METAM SODIUM SOLUTION	17
Sodium N-methyldithiocarbamate	METAM SODIUM SOLUTION	17
Sodium methyldithiocarbamate solution	METAM SODIUM SOLUTION	17
SODIUM NITRITE SOLUTION		17
SODIUM PETROLEUM SULPHONATE		17
SODIUM POLY(4+)ACRYLATE SOLUTIONS		17
Sodium rhodanate solution (56% or less)	SODIUM THIOCYANATE SOLUTION (56% OR LESS)	17
Sodium rhodanide solution (56% or less)	SODIUM THIOCYANATE SOLUTION (56% OR LESS)	17
Sodium salt of sulphonated naphthalene - formaldehyde condensate	NAPHTHALENESULPHONIC ACID- FORMALDEHYDE COPOLYMER, SODIUM SALT SOLUTION	17
SODIUM SILICATE SOLUTION		17
SODIUM SULPHATE SOLUTIONS		17
SODIUM SULPHIDE SOLUTION (15% OR LESS)		17
SODIUM SULPHITE SOLUTION (25% OR LESS)		17
Sodium sulphocyanate solution (56% or less)	SODIUM THIOCYANATE SOLUTION (56% OR LESS)	17
Sodium sulphocyanide solution (56% or less)	SODIUM THIOCYANATE SOLUTION (56% OR LESS)	17
Sodium tetrahydroborate (15% or less) / sodium hydroxide solution	SODIUM BOROXYDRIDE (15% OR LESS)/SODIUM HYDROXIDE SOLUTION (*)	17
SODIUM THIOCYANATE SOLUTION (56% OR LESS)		17

Index Name	Product Name	Chapter
Sodium tolyl oxides solution	CRESYLIC ACID, SODIUM SALT SOLUTION	17
'D-D Soil fumigant'	DICHLOROPROPENE/DICHLOROPROPANE MIXTURES	17
d-Sorbite solution	SORBITOL SOLUTION	18
SORBITOL SOLUTION		18
d-Sorbitol solution	SORBITOL SOLUTION	18
SOYABEAN OIL		17
Soya Methyl Ester (SME)	SOYBEAN OIL FATTY ACID METHYL ESTER	17
SOYBEAN OIL FATTY ACID METHYL ESTER		17
Soybean Oil Methyl Ester	SOYBEAN OIL FATTY ACID METHYL ESTER	17
Spirit of turpentine	TURPENTINE	17
Spirits of wine	ETHYL ALCOHOL	18
Stoddard solvent	WHITE SPIRIT, LOW (15-20%) AROMATIC	17
STYRENE MONOMER		17
Styrol	STYRENE MONOMER	17
Suberane	CYCLOHEPTANE	17
Sulfonic acid, alkane(C10-C21) phenyl ester (a)	ALKYL SULPHONIC ACID ESTER OF PHENOL	17
SULPHOHYDROCARBON (C3-C88)		17
SULPHOLANE		17
SULPHONATED POLYACRYLATE SOLUTION		18
SULPHUR (MOLTEN) (*)		17
SULPHURIC ACID		17
Sulphuric acid, fuming	OLEUM	17
SULPHURIC ACID, SPENT		17
Sulphuric chlorohydrin	CHLOROSULPHONIC ACID	17
Sulphuric ether	DIETHYL ETHER (*)	17
SULPHURIZED FAT (C14-C20)		17
SULPHURIZED POLYOLEFINAMIDE ALKENE (C28-C250) AMINE		17
SUNFLOWER SEED OIL		17
Sweet-birch oil	METHYL SALICYLATE	17
sym-Dichloroethane	ETHYLENE DICHLORIDE	17
sym-Dichloroethyl ether	DICHLOROETHYL ETHER	17
sym-Diisopropylacetone	DIISOBUTYL KETONE	17
sym-Dimethylethylene glycol	BUTYLENE GLYCOL	17
sym-Tetrachloroethane	TETRACHLOROETHANE	17
sym-Trioxane	1,3,5-TRIOXANE	17
TALL OIL, CRUDE		17
TALL OIL, DISTILLED		17
TALL OIL FATTY ACID (RESIN ACIDS LESS THAN 20%)		17
TALL OIL PITCH		17
TALL OIL SOAP, CRUDE		17
TALLOW		17
TALLOW FATTY ACID		17

Index Name	Product Name	Chapter
Tar acids (cresols)	CRESOLS (ALL ISOMERS)	17
Tar camphor	NAPHTHALENE (MOLTEN)	17
Terephthalic acid, dibutyl ester	DIBUTYL TEREPHTHALATE	17
3,6,9,12-Tetraazatetradecamethylenediamine	PENTAETHYLENEHEXAMINE	17
3,6,9,12-Tetraazatetradecane-1,14-diamine	PENTAETHYLENEHEXAMINE	17
1,3,5,7-Tetraazatricyclo[3.3.1.1 ^{3,7}]decane	HEXAMETHYLENETETRAMINE SOLUTIONS	17
TETRACHLOROETHANE		17
1,1,2,2-Tetrachloroethane	TETRACHLOROETHANE	17
Tetrachloroethylene	PERCHLOROETHYLENE	17
1,1,2,2-tetrachloroethylene	PERCHLOROETHYLENE	17
Tetrachloromethane	CARBON TETRACHLORIDE	17
Tetradecan-1-ol	ALCOHOLS (C14-C18), PRIMARY, LINEAR AND ESSENTIALLY LINEAR	17
1-Tetradecanol	ALCOHOLS (C14-C18), PRIMARY, LINEAR AND ESSENTIALLY LINEAR	17
Tetradecene (a)	OLEFINS (C13+, ALL ISOMERS)	17
Tetradecylbenzene	ALKYL(C9+)BENZENES	17
TETRAETHYLENE GLYCOL		17
TETRAETHYLENE PENTAMINE		17
Tetraethyllead	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYL)	17
Tetraethylplumbane	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYL)	17
TETRAETHYL SILICATE MONOMER/OLIGOMER (20% IN ETHANOL)		18
3a,4,7,7a-Tetrahydro-3,5-dimethyl-4,7-methano-1H-indene	METHYLCYCLOPENTADIENE DIMER	17
TETRAHYDROFURAN		17
TETRAHYDRONAPHTHALENE		17
1,2,3,4-Tetrahydronaphthalene	TETRAHYDRONAPHTHALENE	17
Tetrahydro-1,4-oxazine	MORPHOLINE	17
2H-Tetrahydro-1,4-oxazine	MORPHOLINE	17
Tetrahydro-2H-1,4-oxazine	MORPHOLINE	17
Tetrahydrothiophene-1-dioxide	SULPHOLANE	17
Tetrahydrothiophene 1,1-dioxide	SULPHOLANE	17
Tetralin	TETRAHYDRONAPHTHALENE	17
TETRAMETHYLBENZENE (ALL ISOMERS)		17
1,2,3,4-Tetramethylbenzene (a)	TETRAMETHYLBENZENE (ALL ISOMERS)	17
1,2,3,5-Tetramethylbenzene (a)	TETRAMETHYLBENZENE (ALL ISOMERS)	17
1,2,4,5-Tetramethylbenzene (a)	TETRAMETHYLBENZENE (ALL ISOMERS)	17
Tetramethylene cyanide	ADIPONITRILE	17
Tetramethylene dicyanide	ADIPONITRILE	17
Tetramethylene glycol (a)	BUTYLENE GLYCOL	17
Tetramethylene oxide	TETRAHYDROFURAN	17
Tetramethylenesulphone	SULPHOLANE	17
Tetramethyllead	MOTOR FUEL ANTI-KNOCK COMPOUND (CONTAINING LEAD ALKYL)	17
Tetrapropylbenzene	ALKYL(C9+)BENZENES	17
Tetrapropylenebenzene	DODECYLBENZENE	17
Tetryl formate	ISOBUTYL FORMATE	17

Index Name	Product Name	Chapter
4-thiapentanal	3-(METHYLTHIO)PROPIONALDEHYDE	17
Thiophan sulphone	SULPHOLANE	17
Thiosulphuric acid, dipotassium salt (50% or less)	POTASSIUM THIOSULPHATE (50% OR LESS)	17
Titanium(IV) oxide slurry	TITANIUM DIOXIDE SLURRY	17
TITANIUM DIOXIDE SLURRY		17
TOLUENE		17
TOLUENEDIAMINE		17
2,4-Toluenediamine (a)	TOLUENEDIAMINE	17
2,6-Toluenediamine (a)	TOLUENEDIAMINE	17
TOLUENE DIISOCYANATE		17
2-Toluidine	O-TOLUIDINE	17
O-TOLUIDINE		17
Toluol	TOLUENE	17
o-Tolylamine	O-TOLUIDINE	17
2,4-Tolylenediamine (a)	TOLUENEDIAMINE	17
2,6-Tolylenediamine (a)	TOLUENEDIAMINE	17
Tolylenediisocyanate	TOLUENE DIISOCYANATE	17
2,4-Tolylene diisocyanate	TOLUENE DIISOCYANATE	17
m-Tolylene diisocyanate	TOLUENE DIISOCYANATE	17
Toxilic anhydride	MALEIC ANHYDRIDE	17
Treacle (a)	MOLASSES	18
Triacetin	GLYOXAL SOLUTION (40% OR LESS)	17
3,6,9-Triazaundecamethylenediamine	TETRAETHYLENE PENTAMINE	17
3,6,9-Triazaundecane-1,11-diamine	TETRAETHYLENE PENTAMINE	17
TRIBUTYL PHOSPHATE		17
1,2,3-TRICHLOROBENZENE (MOLTEN)		17
1,2,4-TRICHLOROBENZENE		17
1,1,1-TRICHLOROETHANE		17
1,1,2-TRICHLOROETHANE		17
beta-Trichloroethane	1,1,2-TRICHLOROETHANE	17
Trichloroethene	TRICHLOROETHYLENE	17
TRICHLOROETHYLENE		17
Trichloromethane	CHLOROFORM	17
1,2,3-TRICHLOROPROPANE		17
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE		17
TRICRESYL PHOSPHATE (CONTAINING 1% OR MORE ORTHO-ISOMER)		17
TRICRESYL PHOSPHATE (CONTAINING LESS THAN 1% ORTHO-ISOMER)		17
TRIDECANE		17
TRIDECANOIC ACID		17
Tridecanol (a)	ALCOHOLS (C13+)	17
Tridecene (a)	OLEFINS (C13+, ALL ISOMERS)	17
Tridecoic acid	TRIDECANOIC ACID	17
TRIDECYL ACETATE		17

Index Name	Product Name	Chapter
Tridecyl alcohol (a)	ALCOHOLS (C13+)	17
Tridecylbenzene	ALKYL(C9+)BENZENES	17
Tridecylic acid	TRIDECANOIC ACID	17
Tridecylic acid (a)	FATTY ACID (SATURATED C13+)	17
Tri(dimethylphenyl) phosphate (all isomers)	TRIXYLYL PHOSPHATE	17
TRIETHANOLAMINE		17
TRIETHYLAMINE		17
TRIETHYLBENZENE		17
TRIETHYLENE GLYCOL		18
Triethylene glycol butyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Triethylene glycol ethyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Triethylene glycol methyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Triethylene glycol monobutyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
TRIETHYLENETETRAMINE		17
TRIETHYL PHOSPHATE		17
TRIETHYL PHOSPHITE		17
Triformol	1,3,5-TRIOXANE	17
Triglycol	TRIETHYLENE GLYCOL	18
Trihydroxypropane	GLYCERINE	17
Trihydroxytriethylamine	TRIETHANOLAMINE	17
TRIISOPROPANOLAMINE		17
TRIISOPROPYLATED PHENYL PHOSPHATES		17
TRIMETHYLACETIC ACID		17
TRIMETHYLAMINE SOLUTION (30% OR LESS)		17
TRIMETHYLBENZENE (ALL ISOMERS)		17
1,2,3-Trimethylbenzene (a)	TRIMETHYLBENZENE (ALL ISOMERS)	17
1,2,4-Trimethylbenzene (a)	TRIMETHYLBENZENE (ALL ISOMERS)	17
1,3,5-Trimethylbenzene (a)	TRIMETHYLBENZENE (ALL ISOMERS)	17
2,6,6-Trimethylbicyclo[3.1.1]hept-2-ene	ALPHA-PINENE	17
Trimethylcarbinol	TERT-BUTYL ALCOHOL	17
1,1,3-Trimethyl-3-cyclohexene-5-one	ISOPHORONE	17
3,5,5-Trimethylcyclohex-2-enone	ISOPHORONE	17
3,5,5-Trimethylcyclohex-2-en-one	ISOPHORONE	17
TRIMETHYLOL PROPANE PROPOXYLATED		17
2,2,4-Trimethylpentane (a)	OCTANE (ALL ISOMERS)	17
2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		17
2,2,4-Trimethylpentane-1,3-diol diisobutyrate	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	17
2,2,4-TRIMETHYL-1,3-PENTANEDIOL-1-ISOBUTYRATE		17
2,4,4-Trimethylpentene-1	DIISOBUTYLENE	17
2,4,4-Trimethylpent-1-ene	DIISOBUTYLENE	17
2,4,4-Trimethylpentene-2	DIISOBUTYLENE	17
2,4,4-Trimethylpent-2-ene	DIISOBUTYLENE	17

Index Name	Product Name	Chapter
2,4,6-Trimethyl-1,3,5-trioxane	PARALDEHYDE	17
2,4,6-Trimethyl-s-trioxane	PARALDEHYDE	17
Trioxan	1,3,5-TRIOXANE	17
1,3,5-TRIOXANE		17
5,8,11-Trioxapentadecane	DIETHYLENE GLYCOL DIBUTYL ETHER	17
3,6,9-Trioxaundecane	DIETHYLENE GLYCOL DIETHYL ETHER	17
Trioxymethylene	1,3,5-TRIOXANE	17
Tripropylene	PROPYLENE TRIMER	17
TRIPROPYLENE GLYCOL		17
Tripropylene glycol methyl ether (a)	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6) ETHER	17
Tris(dimethylphenyl) phosphate (all isomers)	TRIXYLYL PHOSPHATE	17
Tris(2-hydroxyethyl)amine	TRIETHANOLAMINE	17
2,4-D-tris(2-hydroxy-2-methylethyl)ammonium	2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	17
Tris(2-hydroxypropyl)amine	TRIISOPROPANOLAMINE	17
Tris(2-hydroxy-1-propyl)amine	TRIISOPROPANOLAMINE	17
Tris(2-hydroxypropyl)ammonium 2,4-dichlorophenoxyacetate solution	2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	17
Trisodium 2-[carboxylatomethyl(2-hydroxyethyl)amino]ethyliminodi(acetate) solution	N- (HYDROXYETHYL)ETHYLENEDIAMINETRIAC ETIC ACID, TRISODIUM SALT SOLUTION	17
Trisodium N-(carboxymethyl)-N'-(2-hydroxyethyl)-N,N'-ethylenediglycine solution	N- (HYDROXYETHYL)ETHYLENEDIAMINETRIAC ETIC ACID, TRISODIUM SALT SOLUTION	17
Trisodium N-(2-hydroxyethyl)ethylenediamine-N,N',N'-triacetate solution	N- (HYDROXYETHYL)ETHYLENEDIAMINETRIAC ETIC ACID, TRISODIUM SALT SOLUTION	17
Trisodium nitrilotriacetate solution	NITRILOTRIACETIC ACID, TRISODIUM SALT SOLUTION	17
Tritolyl phosphate, containing less than 1% ortho- isomer	TRICRESYL PHOSPHATE (CONTAINING LESS THAN 1% ORTHO-ISOMER)	17
Tritolyl phosphate, containing 1% or more ortho- isomer	TRICRESYL PHOSPHATE (CONTAINING 1% OR MORE ORTHO-ISOMER)	17
Trixylenyl phosphate	TRIXYLYL PHOSPHATE	17
TRIXYLYL PHOSPHATE		17
TUNG OIL		17
TURPENTINE		17
Turpentine oil	TURPENTINE	17
Turps	TURPENTINE	17
Type A Zeolite slurry (a)	SODIUM ALUMINOSILICATE SLURRY	17
1-Undecanecarboxylic acid	LAURIC ACID	17
N-Undecane (a)	N-ALKANES (C10-C20)	17
UNDECANOIC ACID		17
Undecan-1-ol	UNDECYL ALCOHOL	17
1-UNDECENE		17
Undec-1-ene	1-UNDECENE	17
UNDECYL ALCOHOL		17
Undecylbenzene	ALKYL(C9+)BENZENES	17
Undecylic acid	UNDECANOIC ACID	17
n-Undecylic acid	UNDECANOIC ACID	17

Index Name	Product Name	Chapter
uns-Trimethylbenzene (a)	TRIMETHYLBENZENE (ALL ISOMERS)	17
unsym-Trichlorobenzene	1,2,4-TRICHLOROENZENE	17
UREA/AMMONIUM NITRATE SOLUTION		17
UREA/AMMONIUM PHOSPHATE SOLUTION		17
UREA SOLUTION		17
USED COOKING OIL (M)		17
USED COOKING OIL (TRIGLYCERIDES, C16-C18 AND C18 UNSATURATED)** (M)		17
Valeral	VALERALDEHYDE (ALL ISOMERS)	17
VALERALDEHYDE (ALL ISOMERS)		17
n-Valeraldehyde	VALERALDEHYDE (ALL ISOMERS)	17
Valerianic acid	PENTANOIC ACID	17
Valeric acid	PENTANOIC ACID	17
n-Valeric acid	PENTANOIC ACID	17
Valeric aldehyde	VALERALDEHYDE (ALL ISOMERS)	17
Valerone	DIISOBUTYL KETONE	17
Vaseline (cosmetic)	PARAFFIN WAX, HIGHLY-REFINED	17
VEGETABLE ACID OILS (M)		17
VEGETABLE FATTY ACID DISTILLATES (M)		17
VEGETABLE OIL MIXTURES, CONTAINING LESS THAN 15% FREE FATTY ACID (M)		17
VEGETABLE PROTEIN SOLUTION (HYDROLYSED)		18
Vinegar acid	ACETIC ACID	17
Vinegar naphtha	ETHYL ACETATE	17
VINYL ACETATE		17
Vinylbenzene	STYRENE MONOMER	17
Vinylcarbinol	ALLYL ALCOHOL	17
Vinyl cyanide	ACRYLONITRILE	17
vinyl ethanoate	VINYL ACETATE	17
VINYL ETHYL ETHER		17
Vinylformic acid	ACRYLIC ACID	17
VINYLDENE CHLORIDE		17
VINYL NEODECANOATE		17
VINYLTOLUENE		17
Vinytoluene (all isomers)	VINYLTOLUENE	17
Vinyl trichloride	1,1,2-TRICHLOROETHANE	17
Vitriol brown oil	SULPHURIC ACID	17
WATER		18
Water glass solutions	SODIUM SILICATE SOLUTION	17
White bole	KAOLIN SLURRY	18
White caustic solution	SODIUM HYDROXIDE SOLUTION (*)	17
WHITE SPIRIT, LOW (15-20%) AROMATIC		17
White tar	NAPHTHALENE (MOLTEN)	17
Wine (a)	ALCOHOLIC BEVERAGES, N.O.S.	18
Wintergreen oil	METHYL SALICYLATE	17

Index Name	Product Name	Chapter
Wood alcohol	METHYL ALCOHOL (*)	17
WOOD LIGNIN WITH SODIUM ACETATE/OXALATE		17
Wood naphtha	METHYL ALCOHOL (*)	17
Wood spirit	METHYL ALCOHOL (*)	17
XYLENES		17
XYLENES/ETHYLBENZENE (10% OR MORE) MIXTURE		17
XYLENOL		17
Xylenol (all isomers)	XYLENOL	17
2,3-Xylenol (a)	XYLENOL	17
2,4-Xylenol (a)	XYLENOL	17
2,5-Xylenol (a)	XYLENOL	17
2,6-Xylenol (a)	XYLENOL	17
3,4-Xylenol (a)	XYLENOL	17
3,5-Xylenol (a)	XYLENOL	17
Xylols	XYLENES	17
ZINC ALKARYL DITHIOPHOSPHATE (C7-C16)		17
ZINC ALKENYL CARBOXAMIDE		17
ZINC ALKYL DITHIOPHOSPHATE (C3-C14)		17
Zinc bromide drilling brine	DRILLING BRINES (CONTAINING ZINC CHLORIDE)	17
z-Octadec-9-enamine	OLEYLAMINE	17
(Z)-Octadec-9-enoic acid	OLEIC ACID	17
Z-Octadec-9-enoic acid	OLEIC ACID	17
(Z)-Octadec-9-enylamine	OLEYLAMINE	17

"

4 The complete text of chapter 21 is replaced by the following:

"Chapter 21

Criteria for assigning carriage requirements for products subject to the IBC Code

21.1 Introduction

21.1.1 The following criteria are used for the determination of pollution classification and assignment of appropriate carriage requirements for bulk liquid cargoes being assessed for entry into the IBC Code or lists 1, 3 or 4 of the MEPC.2/Circular.

21.1.2 In developing such criteria, every effort has been made to follow the criteria and cut off points developed under the Globally Harmonized System (GHS).

21.1.3 Although the criteria are intended to be closely defined in order to establish a uniform approach, it must be emphasized that where human experience or other factors indicate the need for alternative arrangements, these shall always be taken into account. Where deviations from the criteria have been recognized, they shall be properly recorded with justifications.

21.2 Contents

21.2.1 This chapter contains the following:

- .1 minimum safety and pollution criteria for products subject to chapter 17 of the IBC Code;
- .2 criteria used to assign the minimum carriage requirements for products that meet the safety or pollution criteria to make them subject to chapter 17 of the IBC Code;
- .3 criteria used for determining special requirements in chapter 15 of the IBC Code to be included in *column o* of chapter 17 of the IBC Code;
- .4 criteria used for determining special requirements in chapter 16 of the IBC Code to be included in *column o* of chapter 17 of the IBC Code;
- .5 definitions of properties used within this chapter;
- .6 information on the use of the GESAMP Hazard Ratings; and
- .7 information on the application of the SVC/LC₅₀ ratio method.

21.2.2 The information included in parentheses following the classification criteria throughout this chapter refers to the GESAMP Hazard Profile ratings set out in appendix I of MARPOL Annex II under the "Abbreviated legend to the revised GESAMP Hazard Evaluation procedure". The full listing of GESAMP Hazard Profile ratings for evaluated substances are published annually in the GESAMP Composite List as a PPR Circular. It should be noted that ratings in parentheses (based on estimation methods applied by GESAMP) are considered as equivalent to ratings without parentheses for the purpose of assigning carriage requirements.

21.3 Minimum safety and pollution criteria for products subject to chapter 17 of the IBC Code

21.3.1 Products are deemed to be hazardous and subject to chapter 17 of the IBC Code if they meet one or more of the following criteria:

- .1 inhalation $LC_{50}/ATE \leq 20$ mg/L/4h (see paragraph 21.7.1.3) (C3 = 1, 2, 3 or 4);
- .2 dermal $LD_{50}/ATE \leq 2000$ mg/kg (see paragraph 21.7.1.2) (C2 = 1, 2, 3, or 4);
- .3 oral $LD_{50}/ATE \leq 2000$ mg/kg (see paragraph 21.7.1.1) (C1 = 1, 2, 3, or 4);
- .4 toxic to mammals by prolonged exposure (see paragraph 21.7.2) (D3 = C, M, R, N, T, or I);
- .5 cause skin sensitization (see paragraph 21.7.3) (D3 = Ss);
- .6 cause respiratory sensitization (see paragraph 21.7.4) (D3 = Sr);
- .7 corrosive to skin (see paragraph 21.7.5) (D1 = 3, 3A, 3B, or 3C);
- .8 with a Water Reactive Index (WRI) of ≥ 1 (see paragraph 21.7.6);
- .9 require inertion, inhibition, stabilization, temperature control or tank environmental control in order to prevent a hazardous reaction (see definitions in paragraph 21.7.10);
- .10 flashpoint $< 23^{\circ}C$; and have an explosive/flammability range (expressed as a percentage by volume in air) of $\geq 20\%$;
- .11 auto-ignition temperature of $\leq 200^{\circ}C$; and
- .12 classified as pollution category X or Y or meeting the criteria for rules 11 to 13 in table 2 in paragraph 21.4.5.2.

21.4 Criteria used to assign the minimum carriage requirements for products that meet the minimum safety or pollution criteria to make them subject to chapter 17 of the IBC Code

21.4.1 Column a – Product name

21.4.1.1 A standardized chemical name, preferably assigned on the basis of the Chemical Abstracts Service (CAS) or the International Union of Pure and Applied Chemistry (IUPAC) system, shall be used as far as possible. However, where this is unnecessarily complex, then a technically correct and unambiguous alternative name may be used.

21.4.2 Column b – Deleted

21.4.3 Column c – Pollution category

21.4.3.1 *Column c* identifies the pollution category assigned to each product in accordance with MARPOL Annex II, based on table 1 below (see MARPOL Annex II, appendix I).

Table 1 – Guidelines for the categorization of Noxious Liquid Substances

Rule	A1 Bio- accumulation	A2 Bio- degradation	B1 Acute toxicity	B2 Chronic toxicity	D3 Long-term health effects	E2 Effects on marine wildlife and on benthic habitats	Cat
1			≥ 5				X
2	≥ 4		4				
3		NR	4				
4	≥ 4	NR			CMRTNI ¹		Y
5			4				
6			3				
7			2				
8	≥ 4	NR		Not 0			
9				≥ 1			
10						Fp, F or S If not Inorganic	
11					CMRTNI ¹		
12	Any product not meeting the criteria of rules 1 to 11 and 13						Z
13	All products identified as: ≤ 2 in column A1; R in column A2; blank in column D3; not Fp, F or S (if not organic) in column E2; and 0 (zero) in all other columns of the GESAMP Hazard Profile						OS

21.4.4 Column d – Hazards

21.4.4.1 An "S" is assigned to *column d* if any of the safety criteria described in paragraphs 21.3.1.1 to 21.3.1.11 are met.

21.4.4.2 A "P" is assigned to *column d* if the product meets the criteria for assigning ship type 1 to 3 as defined by rules 1 to 14 in the table 2.

21.4.5 Column e – Ship type

21.4.5.1 Assignment of ship types is carried out from both a pollution and safety perspective. The basic criteria for assigning ship types from a pollution perspective is carried out based on the GESAMP Hazard Profile, shown in table 2. An explanation of the details in the columns is provided in appendix I of MARPOL Annex II.

21.4.5.2 The following criteria are used to assign the ship type:

Ship type 1:

- Inhalation LC₅₀/ATE ≤ 0.5 mg/L/4h (C3 = 4) and SVC/LC₅₀ ≥ 20; and/or
- Dermal LD₅₀/ATE ≤ 50 mg/kg (C2 = 4); and/or
- WRI = 3; and/or
- Auto-ignition temperature ≤ 65°C; and/or
- Explosive range ≥ 50% v/v in air and the flashpoint < 23°C; and/or
- Rules 1 or 2 of the table 2 shown in 21.4.5.2 (below).

¹ Applies if the D3 rating contains any of these letters or any combination thereof.

Ship type 2:

Inhalation $LC_{50}/ATE \leq 0.5$ mg/L/4h (C3 = 4) and $SVC/LC_{50} < 20$; or
 Inhalation² $LC_{50}/ATE > 0.5$ mg/L/4h – ≤ 2 mg/L/4h (C3 = 3) and $SVC/LC_{50} \geq 2$; and/or
 Dermal $LD_{50}/ATE > 50$ mg/kg – ≤ 200 mg/kg (C2 = 3); and/or
 WRI = 2; and/or
 Auto-ignition temperature $\leq 200^{\circ}C$; and/or
 Explosive range $\geq 40\%$ v/v in air and the flashpoint $< 23^{\circ}C$; and/or
 Any product meeting the criteria of rules 3 to 10 in table 2.

Ship type 3:

Any of the minimum safety or pollution criteria for bulk liquid cargoes subject to chapter 17 of the IBC Code not meeting the requirements for ship types 1 or 2 and not meeting rule 15 of table 2 shown in 21.4.5.2 (below).

Table 2 – Assignment of ship types based on the GESAMP Hazard Profile

Rule	A1	A2	B1	B2	D3	E2	Ship Type
1			≥ 5				1
2	≥ 4	NR	4		CMRTNI ³		
3	≥ 4	NR			CMRTNI ³		
4			4				2
5	≥ 4		3				
6		NR	3				
7				≥ 1			
8						Fp	
9					CMRTNI ³	F	
10			≥ 2			S	
11	≥ 4						3
12		NR					
13			≥ 1				
14	All other category Y Substances						
15	All other category Z Substances All "Other Substances" (OS)						NA

21.4.6 Column f – Tank type

21.4.6.1 The tank type is assigned according to the following criteria:

Tank type 1G: Inhalation $LC_{50}/ATE \leq 0.5$ mg/L/4h (C3 = 4) and $SVC/LC_{50} \geq 1000$; and/or
 Dermal $LD_{50}/ATE \leq 50$ mg/kg (C2 = 4); and/or;
 WRI=3; and/or
 Auto-ignition temperature $\leq 65^{\circ}C$; and/or
 Explosive range $\geq 40\%$ v/v in air and the flashpoint $< 23^{\circ}C$.
 Based on expert judgement, tank type 1G may be required for specific products (e.g. for molten sulphur, hydrochloric acid)

² Products with a density >1025 kg/m³ (sinkers) or a water solubility of $>50\%$ (dissolvers) that are assigned to Ship Type 2 based on the inhalation toxicity criteria, should be re-assigned to Ship Type 3.

³ Applies if the D3 rating contains any of these letters or any combination thereof.

Tank type 2G: Any of the minimum safety or pollution criteria for bulk liquid cargoes subject to chapter 17 or the IBC Code not meeting the requirements for tank type 1G.

21.4.7 *Column g* – Tank vents

21.4.7.1 The tank venting arrangements are assigned according to the following criteria:

Controlled: Inhalation $LC_{50}/ATE \leq 10$ mg/L/4h (C3 = 2, 3 or 4), unless in accordance with 21.7.12; and/or
Toxic to mammals by prolonged exposure (D3 = C, M, R, T, N, or I); and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
Special carriage control needed; and/or
Flashpoint $\leq 60^{\circ}\text{C}$; and
Corrosive to skin (≤ 4 h exposure). (D1 = 3A, 3B, or 3C).

Open: Any of the minimum safety or pollution criteria for bulk liquid cargoes subject to chapter 17 or the IBC Code not meeting the requirements for controlled tank vents.

21.4.8 *Column h* – Tank environmental control

21.4.8.1 The tank environmental control conditions are assigned according to the following criteria:

Inert: Auto-ignition temperature $\leq 200^{\circ}\text{C}$; and/or
Reacts with air to cause a hazard; and/or
Explosive range $\geq 40\%$ and the flashpoint $< 23^{\circ}\text{C}$.
Dry: WRI > 1
Pad: Only applies to specific products identified on a case by case basis.
Vent: Only applies to specific products identified on a case by case basis.
No: Where the above criteria do not apply (inerting requirements may be required under SOLAS).

21.4.9 *Column i* – Electrical equipment

21.4.9.1 If the flashpoint of the product is $\leq 60^{\circ}\text{C}$ or the product is heated to within 15°C of its flashpoint then the electrical equipment required are assigned according to the following criteria, otherwise "-" is assigned in column *i'* and *i''*:

.1 *Column i'* – Temperature class:

T1	Auto-ignition temperature $\geq 450^{\circ}\text{C}$
T2	Auto-ignition temperature $\geq 300^{\circ}\text{C}$ but $< 450^{\circ}\text{C}$
T3	Auto-ignition temperature $\geq 200^{\circ}\text{C}$ but $< 300^{\circ}\text{C}$
T4	Auto-ignition temperature $\geq 135^{\circ}\text{C}$ but $< 200^{\circ}\text{C}$
T5	Auto-ignition temperature $\geq 100^{\circ}\text{C}$ but $< 135^{\circ}\text{C}$
T6	Auto-ignition temperature $\geq 85^{\circ}\text{C}$ but $< 100^{\circ}\text{C}$

.2 **Column i" – Apparatus group:**

Apparatus group	MESG at 20°C (mm)	MIC ratio product/methane
IIA	> 0.90	> 0.80
IIB	> 0.50 to ≤ 0.90	> 0.45 to ≤ 0.80
IIC	≤ 0.50	≤ 0.45

.1 The tests shall be carried out in accordance with the procedures described in IEC 60079-1-1:2002 and IEC 79-3.

.2 For gases and vapours it is sufficient to make only one determination of either the Maximum Experimental Safe Gap (MESG) or the Minimum Igniting Current (MIC) provided that:

for Group IIA: the MESG > 0.90 mm or the MIC ratio > 0.80
for Group IIB: the MESG is > 0.50 mm and ≤ 0.90 mm; or the MIC ratio is > 0.50 and ≤ 0.80
for Group IIC: the MESG is ≤ 0.50 mm or the MIC ratio is ≤ 0.45

.3 It is necessary to determine both the MESG and the MIC ratio when:

.1 The MIC ratio determination only has been made, and the ratio is between 0.80 and 0.90, when an MESG determination will be required;

.2 The MIC ratio determination only has been made, and the ratio is between 0.45 and 0.50, when an MESG determination will be required; or

.3 The MESG only has been found, and is between 0.50 mm and 0.55 mm, when an MIC ratio determination will be required.

.3 **Column i"' Flashpoint:**

> 60°C Yes
≤ 60°C No
Non-flammable NF

21.4.10 Column j – Gauging

21.4.10.1 The gauging equipment is assigned according to the following criteria:

Closed: Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4), unless in accordance with 21.7.12; and/or
Dermal LD₅₀/ATE ≤ 1000 mg/kg (C2 = 2, 3 or 4); and/or
Toxic to mammals by prolonged exposure (D3 = C, M, R, T, N, or I); and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
Severely corrosive to skin (≤ 3 min exposure) (D1= 3C).

- Restricted: Inhalation LC₅₀/ATE >2 - ≤10 mg/L/4h (C3 = 2), unless in accordance with 21.7.12; and/or
Special carriage control indicates inerting required; and/or
Highly corrosive to skin (> 3 min - ≤1h exposure) (D1 = 3B); and/or
Flashpoint ≤ 60°C.
- Open: Any of the minimum safety or pollution criteria for bulk liquid cargoes subject to chapter 17 or the IBC Code not meeting the requirements for closed or restricted gauging.

21.4.11 Column k – Vapour detection

21.4.11.1 The vapour detection equipment is assigned according to the following criteria:

- Toxic (T): Inhalation LC₅₀/ATE ≤ 10 mg/L/4h (C3 = 2, 3, or 4), unless in accordance with 21.7.12, and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4);
and/or
Toxic to mammals by prolonged exposure (D3 = C, M, R, T, N, or I).
- Flammable (F): Flashpoint ≤ 60°C
- No (No): Where the above criteria do not apply

21.4.12 Column l – Fire protection equipment

21.4.12.1 The appropriate firefighting media are defined as being appropriate according to the following criteria related to the properties of the product:

Solubility > 10% (> 100000 mg/L)	A	Alcohol-resistant foam
Solubility ≤ 10% (≤ 100000 mg/L)	A	Alcohol-resistant foam; and/or
	B	Regular foam
WRI = 0	C	Water spray (generally used as a coolant and can be used with A and/or B providing that the WRI = 0)
WRI ≥ 1	D	Dry chemical
	No	No requirements under this Code ⁴

Note: all appropriate media shall be listed.

21.4.13 *Column m* – Deleted

21.4.14 *Column n* – Emergency equipment

21.4.14.1 The requirement to have personnel emergency equipment on board is identified by "Yes" in *column n* according to the following criteria:

Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4); unless in accordance with 21.7.12 and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
Severely corrosive to skin (≤ 3 min exposure) (D1 = 3C); and/or
WRI = 2.

No: indicates that the above criteria do not apply.

21.5 *Column o* – Criteria for special requirements in chapter 15

21.5.1 The assignment of special requirements in *column o* shall normally follow clear criteria based on the data supplied in the reporting form. Where it is considered appropriate to deviate from such criteria, this shall be clearly documented in such a way that it can easily be retrieved on demand.

21.5.2 The criteria for making reference to the special requirements identified in chapters 15 and 16 are defined below with comments where relevant.

21.5.3 Paragraphs 15.2 to 15.10 and 15.20

21.5.3.1 Paragraphs 15.2 to 15.10 and 15.20 identify specific products by name with special carriage requirements that cannot be easily accommodated in any other way.

21.5.4 Paragraph 15.11 – Acids

21.5.4.1 Paragraph 15.11 applies to all acids unless they:

- .1 are organic acids – when only paragraphs 15.11.2 to 15.11.4 and paragraphs 15.11.6 to 15.11.8 apply; or
- .2 do not evolve hydrogen – when paragraph 15.11.5 need not apply.

⁴ This applies where a product as identified as NF in column i" (see paragraph 21.4.9.1.3).

21.5.5 Paragraph 15.12 – Toxic products

21.5.5.1 All of paragraph 15.12 is added to *column o* according to the following criteria:

Inhalation $LC_{50}/ATE \leq 2$ mg/L/4h (C3 = 3 or 4), unless in accordance with 21.7.12;
and/or
the product is a respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
the product is toxic to mammals by prolonged exposure (D3 = C, M, R, T, N, or I).

21.5.5.2 Paragraphs 15.12.3 and 15.12.4 are added to *column o* according to the following criterion:

Inhalation $LC_{50}/ATE > 2 - \leq 10$ mg/L/4h (C3 = 2), unless in accordance with 21.7.12.

21.5.5.3 Paragraph 15.12.3.2 is added to *column o* according to the following criteria:

Dermal $LD_{50}/ATE \leq 1000$ mg/kg (C2 = 2, 3, or 4); and/or
Oral $LD_{50}/ATE \leq 300$ mg/kg (C1 = 2, 3, or 4).

21.5.6 Paragraph 15.13 – Cargoes protected by additives

21.5.6.1 The requirement to assign paragraph 15.13 to *column o* is based on the information related to the product's tendency to polymerize, decompose, oxidize or undergo other chemical changes which may cause a hazard under normal carriage conditions, but which would be prevented by the addition of appropriate additives.

21.5.7 Paragraph 15.14 – Cargoes with a vapour pressure greater than atmospheric at 37.8°C

21.5.7.1 The requirement to assign paragraph 15.14 to *column o* is based on the following criterion:

Boiling point $\leq 37.8^\circ\text{C}$

21.5.8 Paragraph 15.16 – Cargo contamination

21.5.8.1 Paragraph 15.16.1 is deleted.

21.5.8.2 Paragraph 15.16.2 is added to *column o* according to the following criterion:

WRI > 1

21.5.9 Paragraph 15.17 – Increased ventilation requirements

21.5.9.1 Paragraph 15.17 shall be added to *column o* according to the following criteria:

Inhalation $LC_{50}/ATE > 0.5 - \leq 2$ mg/L/4h (C3 = 3), unless in accordance with 21.7.12;
and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
Toxic to mammals by prolonged exposure (D3 = C, M, R, T, N, or I); and/or
Highly to severely corrosive to skin (≤ 1 h exposure time) (D1 = 3B or 3C).

21.5.10 Paragraph 15.18 – Special cargo pump-room requirements

21.5.10.1 Paragraph 15.18 shall be added to *column o* according to the following criterion:
Inhalation LC₅₀/ATE ≤ 0.5 mg/L/4h (C3 = 4), unless in accordance with 21.7.12

21.5.11 Paragraph 15.19 – Overflow control

21.5.11.1 Paragraph 15.19 shall be added to *column o* according to the following criteria:

Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4), unless in accordance with 21.7.12;
and/or
Dermal LD₅₀/ATE ≤ 1000 mg/kg (C2 = 2, 3, or 4); and/or
Oral LD₅₀/ATE ≤ 300 mg/kg (C1 = 2, 3, or 4); and/or
Respiratory sensitizer (D3 = Sr, see also paragraph 21.7.4); and/or
Severely corrosive to skin (≤ 3 min exposure) (D1 = 3C); and/or
Auto-ignition temperature ≤ 200°C; and/or
Explosive range ≥ 40% v/v in air and flashpoint < 23°C; and/or
Classified as ship type 1 on pollution grounds.

21.5.11.2 Only paragraph 15.19.6 shall apply if the product has any of the following properties:

Inhalation LC₅₀/ATE > 2 mg/L/4h - ≤10 mg/L/4h (C3 = 2), unless in accordance with 21.7.12; and/or
Dermal LD₅₀/ATE > 1000 mg/kg - ≤ 2000 mg/kg (C2 = 1); and/or
Oral LD₅₀/ATE > 300 mg/kg - ≤ 2000 mg/kg (C1 = 1); and/or
Skin sensitizer (D3=Ss); and/or
Highly corrosive to skin (> 3 min - ≤ 1h exposure) (D1 = 3B); and/or
Flashpoint ≤ 60°C; and/or
Classified as ship type 2 on pollution grounds; and/or
Pollution category X or Y.

21.5.12 Paragraph 15.21 –Temperature sensors

21.5.12.1 Paragraph 15.21 is added to *column o* according to the heat sensitivity of the product. This requirement is related to pumps in cargo pump-rooms only.

21.6 Column o – Criteria for special requirements in chapter 16.

21.6.1 Paragraphs 16.1 to 16.2.5 and 16.3 to 16.5

21.6.1.1 These apply to all cargoes and so are not referenced specifically in *column o*.

21.6.2 Paragraph 16.2.6

21.6.2.1 Paragraph 16.2.6 is added to *column o* for products, which meet the following criteria:
Pollution Category X or Y and viscosity ≥ 50 mPa·s at 20°C

21.6.3 Paragraph 16.2.9

21.6.3.1 Paragraph 16.2.9 is added to *column o* for products, which meet the following criterion: Melting point ≥ 0°C.

21.6.4 Paragraph 16.6 – Cargo not to be exposed to excessive heat

21.6.4.1 Paragraphs 16.6.2 to 16.6.4 are added to *column o* for products, which are identified as requiring temperature control during carriage.

21.6.5 Paragraph 16.2.7 – Persistent floaters

Paragraph 16.2.7 is added to *column o* for products which meet the following criteria: Pollution Category Y that are persistent floaters (E2 = Fp) with a viscosity greater than or equal to 50mPa•s at 20°C and/or with a melting point greater than or equal to 0°C.

21.7 Definitions

21.7.1 Acute mammalian toxicity

LC₅₀ is the concentration in air, LD₅₀ is the amount (dose) of test substance, which causes mortality to 50% of a test species. ATE refers to a dose (concentration) range or extrapolated dose (concentration) leading to lethal effects in mammals, equivalent to an LC₅₀ or LD₅₀.

21.7.1.1 Acutely toxic if swallowed

Oral toxicity (LD ₅₀ /ATE)		GESAMP Hazard Profile Rating C1
Hazard Level	mg/kg	
High	≤ 5	4
Moderately High	> 5 - ≤ 50	3
Moderate	> 50 - ≤ 300	2
Slight	> 300 - ≤ 2000	1
Negligible	> 2000	0

21.7.1.2 Acutely toxic in contact with skin

Dermal toxicity (LD ₅₀ /ATE)		GESAMP Hazard Profile Rating C2
Hazard Level	mg/kg	
High	≤ 50	4
Moderately high	> 50 - ≤ 200	3
Moderate	> 200 - ≤ 1000	2
Slight	> 1000 - ≤ 2000	1
Negligible	> 2000	0

21.7.1.3 Acutely toxic by inhalation⁵

Inhalation toxicity (LC ₅₀ /ATE)		GESAMP Hazard Profile Rating C3
Hazard level	mg/L/4h	
High	≤ 0.5	4
Moderately high	> 0.5 - ≤ 2	3
Moderate	> 2 - ≤ 10	2
Slight	> 10 - ≤ 20	1
Negligible	> 20	0

⁵ All inhalation toxicity data are assumed to be for vapours and not mists or sprays, unless otherwise indicated.

21.7.2 Toxic to mammals by prolonged exposure

21.7.2.1 A product is classified as *toxic to mammals by prolonged exposure* if it meets any of the following criteria: it is known to be, or suspected of being carcinogenic, mutagenic, reprotoxic, neurotoxic, immunotoxic or exposure below the lethal dose is known to cause Specific Target Organ Toxicity.

21.7.2.2 Such effects may be identified from the GESAMP Hazard Profile of the product (D3 = C, M, R, T, N, or I) or other recognized sources of such information.

21.7.3 Skin sensitization

21.7.3.1 A product is classified as a *skin sensitizer*:

- .1 if there is evidence in humans that the substance can induce sensitization by skin contact in a substantial number of persons; or
- .2 where there are positive results from an appropriate test.

21.7.3.2 Such effects are identified in the GESAMP Hazard Profile for the product (D3 = Ss).

21.7.4 Respiratory sensitization

21.7.4.1 A product is classified as a *respiratory sensitizer*:

- .1 if there is evidence in humans that the substance can induce specific respiratory hypersensitivity; and/or
- .2 where there are positive results from an appropriate test; and/or
- .3 where the product does not have a GESAMP Hazard Profile and is identified as a skin sensitizer and there is no evidence to show that it is not a respiratory sensitizer.

21.7.4.2 Such effects are identified in the GESAMP Hazard Profile for the product (D3 = Sr) or other recognized sources of such information, if no profile exists.

21.7.5 Corrosive to skin

Hazard Level	Exposure time to cause full thickness necrosis of skin	GESAMP Hazard Profile rating (D1)
Severely corrosive to skin	≤ 3 min	3C
Highly corrosive to skin	> 3 min - ≤ 1h	3B (3 ⁶)
Moderately corrosive to skin	> 1h - ≤ 4h	3A

⁶ Note: A rating of 3 in the D1 column of the GESAMP Hazard Profile, without any additional letter notation (A, B or C), means that the severity of corrosivity has not been established. For such cases, a rating of 3 is understood to be equivalent to a rating of 3B for the purpose of assigning carriage requirements.

21.7.6 Water reactive substances⁷

21.7.6.1 These are classified as follows:

Water Reactive Index (WRI)	Definition
3	Any chemical which is extremely reactive with water and produces large quantities of flammable, toxic or corrosive gas or aerosol
2	Any chemical which, in contact with water, may produce a toxic, flammable or corrosive gas or aerosol
1	Any chemical which, in contact with water, may generate heat or produce a non-toxic, non-flammable or non-corrosive gas
0	Any chemical which, in contact with water, would not undergo a reaction to justify a value of 1, 2 or 3

21.7.7 Air reactive substances

21.7.7.1 Air reactive substances are products that react with air to cause a potentially hazardous situation, e.g. the formation of peroxides that may cause an explosive reaction.

21.7.8 Electrical apparatus – Temperature class

(for products which either have a flashpoint of $\leq 60^{\circ}\text{C}$ or are heated to within 15°C of their flashpoint)

21.7.8.1 The temperature class is defined by the International Electrotechnical Commission (IEC) as:

"The highest temperature attained under practical conditions of operation within the rating of the apparatus (and recognized overloads, if any, associated therewith) by any part of any surface, the exposure of which to an explosive atmosphere may involve a risk."

21.7.8.2 The temperature class of the electrical apparatus is assigned by selecting the Maximum Surface Temperature which is closest to, but less than, the product's auto-ignition temperature (see 21.4.9.1.1).

21.7.9 Electrical apparatus – Apparatus group

(for products with a flashpoint of $\leq 60^{\circ}\text{C}$)

21.7.9.1 This refers to intrinsically safe and associated electrical apparatus for explosive gas atmospheres which the IEC divide into the following groups:

Group I: for mines susceptible to firedamp (not used by IMO); and

Group II: for applications in other industries – further sub-divided according to its Maximum Experimental Safe Gap (MESG) and/or the Minimum Igniting Current (MIC) of the gas/vapour into groups IIA, IIB and IIC.

21.7.9.2 This property cannot be determined from other data associated with the product; it has to be either measured or assigned by assimilation with related products in a homologous series.

⁷ Products that are corrosive to skin are also deemed to be corrosive by inhalation.

21.7.10 Special carriage control conditions

21.7.10.1 Special carriage control conditions refer to specific measures that need to be taken in order to prevent a hazardous reaction. They include:

- .1 *Inhibition*: the addition of a compound (usually organic) that retards or stops an undesired chemical reaction such as corrosion, oxidation or polymerization;
- .2 *Stabilization*: the addition of a substance (stabilizer) that tends to keep a compound, mixture or solution from changing its form or chemical nature. Such stabilizers may retard a reaction rate, preserve a chemical equilibrium, act as antioxidants, keep pigments and other components in emulsion form or prevent the particles in colloidal suspension from precipitating;
- .3 *Inertion*: the addition of a gas (usually nitrogen) in the ullage space of a tank that prevents the formation of a flammable cargo/air mixture;
- .4 *Temperature control*: the maintenance of a specific temperature range for the cargo in order to prevent a hazardous reaction or to keep the viscosity low enough to allow the product to be pumped; and
- .5 *Padding and venting*: only applies to specific products identified on a case by case basis.

21.7.11 Flammable cargoes

21.7.11.1 A cargo is defined as flammable according to the following criteria:

IBC Code descriptor	Flashpoint (degrees Centigrade)
Highly flammable	< 23
Flammable	≤ 60 but ≥ 23

21.7.11.2 It should be noted that flashpoints of mixtures and aqueous solutions need to be measured unless all of the components are non-flammable.

21.7.11.3 It should be noted that the carriage of bulk liquid cargoes that have a flashpoint of ≤ 60°C are subject to other SOLAS regulations.

21.7.12 Application of the SVC/LC₅₀ ratio method

21.7.12.1 If the vapour pressure and the molecular weight of a substance are known, an estimate of the maximum vapour concentration in a closed compartment (e.g. a tank) can be calculated. This is called the Saturated Vapour Concentration (SVC).

21.7.12.2 The hazard quotient SVC/LC₅₀⁸ is a substance specific value for the velocity of a vapour for achieving a hazardous concentration when emerging from a liquid source (e.g. leak, spillage or tank ventilation), and can be used in the assignment of specific carriage requirements related to inhalation toxicity.

21.7.12.3 If a solid substance is transported in an aqueous solution, the vapour pressure⁹ of this solid rather than that of water may be used in the calculation of the SVC/LC₅₀ ratio.

21.7.12.4 Application of the SVC/LC₅₀ ratio for assigning Ship Type and Tank type

21.7.12.4.1 For the assignment of ship type and tank type, as set out in paragraph 21.4.5 and 21.4.6, the application of the SVC/LC₅₀ ratio method is optional. Should this method be used, the vapour pressure at 20°C shall be used when calculating the SVC/LC₅₀ ratio.

21.7.12.4.2 The SVC mg/L of a substance should be calculated as follows:

$$SVC(mg/L) = \left(\frac{\text{Vapour pressure @ } 20^{\circ} C (Pa)}{101300 (Pa)} \times 10^6 \right) \times \frac{M_w \left(\frac{g}{mol} \right)}{24(L/mol) \times 1000}$$

where M_w is the molecular weight of the substance.

21.7.12.4.3 The SVC/LC₅₀ ratio should be calculated as follows:

$$SVC/LC_{50} = \frac{SVC (mg/L)}{LC_{50} mg/L/4h}$$

21.7.12.5 Application of the SVC/LC₅₀ ratio for assigning carriage requirements

21.7.12.5.1 For the carriage requirements listed in 21.7.12.5.5, the application of the SVC/LC₅₀ ratio method is optional. If the SVC/LC₅₀ ratio method is used in the assignment of these carriage requirements, the vapour pressure at 40°C shall be used when calculating the SVC/LC₅₀ ratio. If the carriage temperature is higher than 40°C, then the SVC/LC₅₀ ratio should be calculated at that temperature.

21.7.12.5.2 The SVC (mg/l) of a substance should be calculated as follows:

$$SVC(mg/L) = \left(\frac{\text{Vapour pressure @ } 40^{\circ} C (Pa)}{101300 (Pa)} \times 10^6 \right) \times \frac{M_w \left(\frac{g}{mol} \right)}{[26](L/mol) \times 1000}$$

where M_w is the molecular weight of the substance.

21.7.12.5.3 The SVC/LC₅₀ ratio should be calculated as follows:

$$SVC/LC_{50} = \frac{SVC (mg/L)}{LC_{50} mg/L/4h}$$

⁸ ATE values can be considered as equivalent to LC₅₀ values. See paragraph 21.7.1.

⁹ If this data is not available, an estimate may be used.

21.7.12.5.4 The SVC (mg/L) formula described in 21.7.12.5.2 is standardized for calculations at 40°C. When using the vapour pressure at higher temperatures in the calculations, the formula must be amended accordingly.

21.7.12.5.5 For the following carriage requirements, the SVC/LC₅₀ ratio method, calculated at 40°C or higher, may be used as an alternative to the acute inhalation toxicity criteria given in paragraphs 21.4 and 21.5:

.1 **Column g – Tank vents**

Assignment of controlled venting is not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE ≤ 10 mg/L/4h (C3 = 2, 3, or 4) and SVC/LC₅₀ < 0.2

.2 **Column j – Gauging**

Closed gauging is not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4) and SVC/LC₅₀ < 0.2 but restricted gauging is required.

Restricted gauging is not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE > 2 - ≤ 10 mg/L/4h (C3 = 2) and SVC/LC₅₀ < 0.2

.3 **Column k – Vapour detection**

Assignment of toxic vapour detection is not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE ≤ 10 mg/L/4h (C3 = 2, 3, or 4) and SVC/LC₅₀ < 0.2

.4 **Column n – Emergency Equipment**

Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4) and SVC/LC₅₀ < 0.2

.5 **Column o – Special requirements in chapter 15**

15.12.1 and 15.12.2 are not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE ≤ 2 mg/L/4h (C3 = 3 or 4) and SVC/LC₅₀ < 0.2

15.12.3 and 15.12.4 are not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE > 2 - ≤ 10 mg/L/4h (C3 = 2) and SVC/LC₅₀ < 0.2

15.17 is not required based on the inhalation hazard only, if:

Inhalation LC₅₀/ATE ≤ 0.5 mg/L/4h (C3 = 4) and SVC/LC₅₀ < 0.2

15.18 is not required based on the inhalation hazard only if:

Inhalation $LC_{50}/ATE \leq 0.5$ mg/L/4h (C3 = 4) and $SVC/LC_{50} < 0.2$

15.19 is not required based on the inhalation hazard only, if:

Inhalation $LC_{50}/ATE \leq 2$ mg/L/4h (C3 = 3 or 4) and $SVC/LC_{50} < 0.2$, but 15.19.6 applies

15.19.6 is not required based on the inhalation hazard only, if:

Inhalation $LC_{50}/ATE > 2 - \leq 10$ mg/L/4h (C3 = 2) and $SVC/LC_{50} < 0.2$ "

ANNEX 12

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

Chapter IV

Special requirements

- 1 A new section 4.24 is inserted after existing section 4.23:

"4.24 Hydrogen sulphide (H₂S) detection equipment for bulk liquids

Hydrogen sulphide (H₂S) detection equipment shall be provided on board ships carrying bulk liquids prone to H₂S formation. It should be noted that scavengers and biocides, when used, may not be a 100% effective in controlling the formation of H₂S."

Chapter V

Operational requirements

- 2 Paragraph 5.2.7 is replaced by the following:

"5.2.7 Where *column m** in the table of chapter VI refers to this paragraph, the cargo is subject to the prewash requirements in regulation 13.7.1.4 of Annex II of MARPOL"

Chapter VI

Summary of minimum requirements

IBC/BCH Codes cross-references to the requirements

- 2 The following cross-references are added under section "Special requirements (*column o*):

"15.15 4.24
16.2.7 5.2.7"

ANNEX 13

DRAFT AMENDMENTS TO MARPOL ANNEX II

(Cargo residues and tank washings of persistent floating products)

CHAPTER 1 – GENERAL

Regulation 1

Definitions

1 A new paragraph 23 is added as follows:

"23 *Persistent floater* means a slick forming substance with the following properties:

- Density: \leq sea water (1025 kg/m^3 at 20°C);
- Vapour pressure: $\leq 0.3 \text{ kPa}$;
- Solubility: $\leq 0.1\%$ (for liquids) $\leq 10\%$ (for solids); and
- Kinematic viscosity: $> 10 \text{ cSt}$ at 20°C ."

CHAPTER 5 – OPERATIONAL DISCHARGES OF RESIDUES OF NOXIOUS LIQUID SUBSTANCES

Regulation 13 - Control of discharges of residues of noxious liquid substances

2 A new paragraph 7.1.4 is inserted after existing paragraph 7.1.3 as follows:

"7.1.4 For substances assigned to category Y that are persistent floaters with a viscosity equal to or greater than $50 \text{ mPa}\cdot\text{s}$ at 20°C and/or with a melting point equal to or greater than 0°C , as identified by "16.2.7" in column "o" of chapter 17 of the IBC Code, the following shall apply in the areas in paragraph 9:

- .1 a prewash procedure as specified in appendix VI shall be applied;
- .2 the residue/water mixture generated during the prewash shall be discharged to a reception facility at the port of unloading until the tank is empty; and
- .3 any water subsequently introduced into the tank may be discharged into the sea in accordance with the discharge standards in regulation 13.2."

3 The following new paragraph 9 is inserted after existing paragraph 8.2:

"9 Areas to which regulation 13.7.1.4 applies

9.1 the *North West European waters* include the North Sea and its approaches, the Irish Sea and its approaches, the Celtic Sea, the English Channel and its approaches and part of the North East Atlantic immediately to the west of Ireland. The area is bounded by lines joining the following points:

48°27' N on the French coast
48°27' N; 006°25' W
49°52' N; 007°44' W
50°30' N; 012° W
56°30' N; 012° W
62° N; 003° W
62° N on the Norwegian coast
57°44'.8 N on the Danish and Swedish coasts

9.2 the *Baltic Sea area*, means the Baltic Sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57°44'.8 N;

9.3 the *Western European waters* is an area that covers the United Kingdom, Ireland, Belgium, France, Spain and Portugal, from the Shetland Islands in the North to Cape S. Vicente in the South, and the English Channel and its approaches. The area is bounded by lines joining the following points:

58°30' N on the UK coast
58°30' N; 000° W
62° N; 000° W
62° N; 003°W
56°30' N; 012° W
54°40'40.9" N; 015° W
50°56'45.3" N; 015° W
48°27' N; 006°25' W
48°27' N; 008° W
44°52' N; 003°10' W
44°52' N; 010° W
44°14' N; 011°34' W
42°55' N; 012°18' W
41°50' N; 011°34' W
37°00' N; 009°49' W
36°20' N; 009°00' W
36°20' N; 007°47' W
37°10' N; 007°25' W
51°22'25" N; 003°21'52.5" E
52°12' N; on the UK east coast
52°10.3' N; 006°21.8' W
52°01.52' N; 005°04.18' W
54°51.43' N; 005°08.47' W
54°40.39' N; 005°34.34' W

9.4 the *Norwegian Sea* is bounded by lines joining the following points:

69°47.6904' N, 030°49.059' E
69°58.758' N, 031°6.2598' E
70°8.625' N, 031°35.1354' E
70°16.4826' N, 032°4.3836' E
73°23.0652' N, 036°28.5732' E
73°35.6586' N, 035°27.3378' E
74°2.9748' N, 033°17.8596' E
74°20.7084' N, 030°33.5052' E
74°29.7972' N, 026°28.1808' E
74°24.2448' N, 022°55.0272' E
74°13.7226' N, 020°15.9762' E
73°35.439' N, 016°36.4974' E
73°14.8254' N, 014°9.4266' E
72°42.54' N, 011°42.1392' E
71°58.2' N, 009°54.96' E
71°37.5612' N, 008°43.8222' E
70°43.161' N, 006°36.0672' E
69°36.624' N, 004°47.322' E
68°58.3164' N, 003°51.2154' E
68°14.9892' N, 003°17.0322' E
67°25.7982' N, 003°10.2078' E
66°49.7292' N, 003°25.1304' E
66°25.9344' N, 003°17.1102' E
65°22.7214' N, 001°24.5928' E
64°25.9692' N, 000°29.3214' W
63°53.2242' N, 000°29.442' W
62°53.4654' N, 000°38.355' E
62° N, 001°22.2498' E
62° N, 004°52.3464' E

APPENDIX IV – STANDARD FORMAT FOR THE PROCEDURES AND ARRANGEMENTS MANUAL

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

4 Paragraph 4.4.5 is replaced by the following:

"5 **Persistent floaters with a viscosity equal to or greater than 50 mPa•s at 20°C and/or a melting point equal to or greater than 0°C**

This section should contain instructions on how to deal with tank washings of substances identified by the presence of 16.2.7 in column o of chapter 17 of the IBC Code and the latest version of the MEPC.2/Circular, when operating in the areas specified in regulation 13.9."

Addendum A - Flow diagrams – Cleaning of cargo tanks and disposal of tank washings/ballast containing residues of category X, Y and Z substances

5 A new Note 4 is inserted after existing Note 3 as follows:

"Note 4: Within the areas specified in regulation 13.9 of Annex II, regulation 13.7.1.4 applies to substances that are identified by "16.2.7" in column "o" of chapter 17 of the IBC Code."

APPENDIX VI – PREWASH PROCEDURES

6 A new section C is added after existing paragraph 21 as follows:

"C For all ships

Prewash procedures for persistent floaters to which regulation 13.7.1.4 of Annex II of MARPOL applies

Persistent floaters with a viscosity equal to or greater than 50 mPa•s at 20°C and/or a melting point equal to or greater than 0°C, shall be treated as solidifying or high-viscosity substances for the purposes of the prewash.

Where it is determined that the use of small amounts of cleaning additives would improve and maximize the removal of cargo residues during a prewash, then this should be done in consultation and with prior agreement from the reception facility."

ANNEX 14

**RESOLUTION MEPC.311(73)
(adopted on 26 October 2018)**

**2018 GUIDELINES FOR THE APPLICATION OF MARPOL ANNEX I REQUIREMENTS TO
FLOATING PRODUCTION, STORAGE AND OFFLOADING FACILITIES (FPSOs)
AND FLOATING STORAGE UNITS (FSUs)**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its fifty-third session, it adopted , by resolution MEPC.139(53), the *Guidelines for the application of the revised MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs)* (Guidelines), which were further amended by resolution MEPC.142(54),

RECOGNIZING the need to align the relevant provisions of the Guidelines with the amendments to MARPOL Annex I adopted since MEPC 54.

HAVING CONSIDERED, at its seventy-third session, draft 2018 Guidelines for the application of MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs) prepared by the Sub-Committee on Pollution Prevention and Response, at its fifth session,

- 1 ADOPTS the *2018 Guidelines for the application of MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs)*;
- 2 INVITES Governments to take the 2018 Guidelines into account when applying the relevant requirements of MARPOL Annex I to FPSOs and FSUs;
- 3 AGREES to keep the 2018 Guidelines under review in light of experience gained;
- 4 REVOKES the *Guidelines for the application of the revised MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs)* (resolution MEPC.139(53), as amended by resolution MEPC.142(54)).

ANNEX

**2018 GUIDELINES FOR THE APPLICATION OF MARPOL ANNEX I REQUIREMENTS TO
FLOATING PRODUCTION, STORAGE AND OFFLOADING FACILITIES (FPSOs) AND
FLOATING STORAGE UNITS (FSUs)**

1 The Marine Environment Protection Committee, at its forty-ninth session (14 to 18 July 2003), recognizing the necessity to provide appropriate guidance for the application of MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) used for the offshore production and storage of oil, and floating storage units (FSUs) used for the offshore storage of produced oil, approved the Guidelines for application of MARPOL Annex I requirements to FPSOs and FSUs. The Guidelines were issued as MEPC/Circ.406 on 10 November 2003.

2 The Marine Environment Protection Committee, at its fifty-third session, adopted, by resolution MEPC.139(53), *the Guidelines for the application of the revised MARPOL Annex I requirements to floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs)* to replace MEPC/Circ.406 and update the Guidelines' references to the requirements of MARPOL Annex I as amended by resolution MEPC.117(52).

3 The Marine Environment Protection Committee, at its seventy-third session, recognizing that similar revision would be needed for the Guidelines, agreed to the adoption of these Guidelines to replace resolution MEPC.139(53), as amended, with a view to updating the Guidelines to address the application of all new MARPOL Annex I amendments up to resolution MEPC.276(70).

4 The purpose of these Guidelines is to provide for uniform application of MARPOL Annex I requirements to FPSOs and FSUs that are used for the offshore production and storage or for the offshore storage of produced oil.

5 The Committee noted the complex issues involved in applying the requirements of MARPOL Annex I to FPSOs and FSUs, whose arrangements, functions and operations fall under the over-riding control of coastal States.

6 In addition, the Committee found that the role of FPSOs and FSUs in operation does not include transport of oil. Accordingly, FPSOs and FSUs are a form of floating platform and do not lie within the definition of *oil tanker* in regulation 1.5 of MARPOL Annex I. They are therefore subject to the provisions of MARPOL Annex I that relate to fixed and floating platforms, including regulation 39.

7 The Committee noted that the environmental hazards associated with the quantities of produced oil stored on board operational FPSOs and FSUs are similar to some of the hazards related to oil tankers, and that relevant requirements of MARPOL Annex I in relation to *oil tankers* could be adapted to address those hazards in an appropriate manner. Based on the above and recognizing that these floating platforms are stationary when operating, the Committee recommends that coastal States, flag States and others associated with the design, construction and operation of FPSOs and FSUs apply the relevant MARPOL Annex I regulations referred to in annex 1 to the Guidelines. References contained in annex 1 relate to MARPOL Annex I up to and including the amendments contained in resolution MEPC.276(70).

8 These Guidelines have been prepared with a view to providing the necessary guidance and interpretation information which may be specifically applicable to FPSOs and FSUs, and accordingly represent a single document describing the application of MARPOL Annex I to these floating platforms.

9 The provisions of these Guidelines are for application to FPSOs and FSUs when located at their operating station. However they also take into account the abnormal and rare circumstances of:

- .1 voyages for drydocking, repair or maintenance work; or
- .2 disconnection of the platform in extreme environmental or emergency conditions.

In either case, the FPSO/FSU should not transport oil to a port or terminal except with the specific agreement of the flag and relevant coastal States, obtained on a single voyage basis. When undertaking any voyage away from the operating station, for whatever purpose, FPSOs and FSUs will be required to comply with the discharge provisions of MARPOL Annex I for *oil tankers*.

10 In order to avoid development of an entire new text from MARPOL Annex I attending to such terminology matters and notwithstanding the basis for these Guidelines outlined above, in any regulation indicated to apply to FPSOs and FSUs by the Guidelines at annex 1, the following interpretation of terminology should be used:

- .1 "oil tanker" should be read as "FPSO or FSU";
- .2 "carry" should be read as "hold";
- .3 "cargo" should be read as "produced oil and oily mixtures"; and
- .4 "voyage" should be read to include "operations".

11 Oil tanker requirements that are extended by the Guidelines to apply to FPSOs/FSUs are identified through the phrase "recommend application" or similar, while "applies" is used for requirements to be implemented irrespective of the contents of these Guidelines.

12 The requirement for oil tankers to undergo enhanced surveys is contained in SOLAS regulation XI-1/2. Since SOLAS does not apply to the vast majority of FPSOs and FSUs, which are permanently moored at their operating stations, the relevant oil tanker requirements of resolution A.1049(27) (2011 ESP Code) have been included as one of the provisions of the Guidelines in order to ensure a satisfactory standard of structural integrity for FPSOs and FSUs. Reflecting the operational characteristics of FPSOs and FSUs, the Guidelines also make provision for limited departure from resolution A.1049(27) in respect of acceptance of in-water surveys under conditions which do not compromise safety and pollution prevention.

13 In implementing the provisions of these Guidelines, Member Governments are invited to use and recognize the Record of Construction and Equipment for FPSOs and FSUs at annex 2 in place of Forms A and B appended to MARPOL Annex I.

14 The Committee noted that most operations of FPSOs and FSUs are different from other ships covered by MARPOL Annex I and, recognizing that the coastal State has jurisdiction over fixed and floating platforms operating in waters under its jurisdiction, Member Governments may find it necessary to depart from the provisions of these Guidelines. Accordingly, Member Governments are invited to advise the Organization of their experience in applying these Guidelines so that it can be taken into account if future amendments to these Guidelines are deemed necessary.

ANNEX 1

**RECOMMENDED PROVISIONS OF MARPOL ANNEX I FOR APPLICATION TO
FPSOs AND FSUs**

Article	Subject	Basis of Application
Art. 2(3)(b)(ii)	Def. <i>Discharge</i>	In accordance with Reg. 39 and UI 67, produced water, offshore processing drainage and displacement water are not included in the meaning of <i>discharge</i> .
Art. 2(4)	Def. <i>Ship</i>	FPSOs/FSUs are "fixed or floating platforms" and are therefore included in this definition.

Regulation	Subject	Basis of Application
1.1 to 1.4	Defs. <i>Oil, Crude Oil, Oily mixture, Oil fuel</i>	Apply.
1.5	Def. <i>Oil tanker</i>	FPSOs/FSUs are adapted primarily for a purpose other than to carry (transport) oil and are therefore excluded from this definition.
1.6 and 1.7	Defs. <i>Crude Oil tanker, Products carrier</i>	Not applicable.
1.8	Def. <i>Combination carrier</i>	Not applicable for same reasons as 1.5.
1.9	Def. <i>Major conversion</i>	Conversion of an <i>oil tanker</i> or <i>combination carrier</i> to an FPSO/FSU and <i>vice versa</i> should be considered to be a <i>major conversion</i> . Alterations or modifications required for an existing FPSO/FSU to move to another field should not be considered a <i>major conversion</i> .
1.10 and 1.11	Defs. <i>Nearest land, Special area</i>	Apply.
1.12	Def. <i>Instantaneous rate of discharge of oil</i>	Not applicable to FPSO/FSU at operating station as this definition applies when the ship is under way (refer regs. 34.1.4 and 31.2, 31.3 and 36.6).
1.13 to 1.26	Defs. <i>Various</i>	Apply.
1.27	Def. <i>Anniversary date</i>	Applies.
1.28.1, 1.28.2 and 1.28.9	Defs. <i>Ship age groups</i>	Apply.
1.28.3 to 1.28.8	Defs. <i>Oil tanker age groups</i>	Not applicable.
1.29 to 1.38	Defs. <i>Various</i>	Apply.
2.1	Application	Applies.

Regulation	Subject	Basis of Application
2.2 and 2.3	Application	Not applicable as the scope of application of these Guidelines is for FPSOs and FSUs when located at their normal operational station, including where appropriate temporary disconnection from the riser at the operating station for the minimum period necessary to ensure the safety of the vessel in extreme environmental or emergency conditions.
2.4	Application	Not applicable.
2.5 and 2.6	Existing tankers engaged in specific trades	Not applicable.
3.1 to 3.3	Exemptions and waivers	Any Administration using this clause in relation to FPSOs/FSUs would need to justify such use in relation to the terms of paragraph .1 and in accordance with the requirements of paragraph .3.
3.4 and 3.5	Exemptions and waivers	Recommend application in order to sanction the waiver arrangements outlined in 3.1.2, e.g. for operations within special areas (3.5.2.1) in compliance with 3.5.2.4 to 3.5.2.7. Transfer of oily mixtures to offload tankers for discharge ashore is acceptable within this waiver.
3.6	Exemptions and waivers	Recommend application. ¹
4	Exceptions	Applies.
5	Equivalents	Applies.
6	Surveys and inspections	Applies. Notwithstanding whether SOLAS 74 applies to an FPSO/FSU, surveys of FPSOs and FSUs should be conducted to the standard specified for <i>oil tankers</i> in SOLAS 74 regulation XI-1/2, except for the provisions of 2.2 of Annex B, Parts A and B, to resolution A.1049(27) (2011 ESP Code), as amended in relation to dry-dock survey. The coastal and flag States may accept bottom survey of the ship afloat instead of in dry-dock when the conditions are satisfactory and the proper equipment and suitably qualified personnel are available.
7	Issue of certificate	IOPP Certificate should be issued unless flag and coastal States have other means of certificating/documenting compliance.
8	Issue of certificate by another Government	Applicable.
9	Form of certificate	Applicable. When completing the IOPP certificate, FPSOs'/FSUs' "type of ship" should be shown as "ship other than any of the above" and this entry should be annotated with "FPSO" or "FSU" together with details of operational location. Record of Construction and Equipment for FPSOs and FSUs given at Annex 2 should be used for the IOPP Supplement. Where this is done, Form A or Form B required by the Convention need not be provided.

¹ If an Administration decides to apply these provisions to FPSOs and FSUs, it is invited to notify all parties involved so that a sufficient amount of time is allowed for the provisions to be complied with, which should be at least one year from the date of notification.

Regulation	Subject	Basis of Application
10	Duration of certificate	Applicable.
11	Port State control on operational requirements	Applies to FPSO/FSU at its operating station, recognizing that under Art. 2(5) and UNCLOS Arts. 56 and 60, the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources. However, port State control powers are applicable at other times such as if the FPSO/FSU voyages to a port in another State for maintenance purposes.
12	Tanks for oil residues (sludge)	Applicable.
12A	Oil fuel tank protection	Applies to new purpose built FPSOs and FSUs only excluding the requirements of paragraph 6. However, when undertaking any voyage away from the operating station for whatever purpose, the double bottom oil fuel tanks are to be empty unless they are in compliance with the requirements of paragraph 6.
13	Standard discharge connection	Applicable.
14	Oil filtering equipment	Applicable subject to applicable provisions of Reg. 15 and 34. For reasons of practicality, the equipment need not be fitted provided the machinery space discharges are disposed of in accordance with options a, b, d or e in relation to regulation 15.2. A waiver may be issued under 14.5.3, where all oily mixtures are discharged either ashore or into production stream.
15A	Discharges outside special areas	In accordance with Reg. 39 and UI 67, applies only to machinery space discharges and contaminated sea water from operational purposes such as produced oil tank cleaning water, produced oil tank hydrostatic testing water, water from ballasting of produced oil tank to carry out inspection by rafting. Since FPSOs/FSUs and other fixed and floating platforms cannot comply with 15.2.1 when operating on station then these oils and oily mixtures may, with the agreement of the coastal State: <ul style="list-style-type: none"> a. be sent ashore; b. be incinerated; c. have water separated and discharged if not exceeding 15 ppm oil content under 34.2; d. be discharged in accordance with this clause subject to waiver of the <i>en route</i> requirement; e. be added to the production stream; or f. be treated using a combination of these methods.
15B	Discharges in special areas	Applicable, but FPSOs/FSUs cannot comply with 15.3.1 when operating on station. This requirement should be handled consistent with 15A above. Coastal State may issue dispensation from 15.3.1 where satisfied that this dispensation does not prejudice the environment.

Regulation	Subject	Basis of Application
15C and 15D	Requirements for ships <400 GT and general req.	Apply.
16.1, 16.2 and 16.4	Segregation of oil and water ballast and carriage of oil in forepeak tanks	Apply. The principles of 16.3 should be extended to all other FPSOs and FSUs.
16.3	"	Applies to FPSOs/FSUs which are capable of disconnecting from the riser at the operating station as collision bulkhead requirement is in SOLAS rather than MARPOL. This principle is also relevant to stern collision as per 19.7.
17	Oil Record Book Part I	Applies.
18.1 to 18.9	Segregated ballast tanks	Recommend application subject to the conditions listed for 18.2 and 18.3.
18.2	"	Not applicable, but FPSO/FSU should have sufficient ballast capacity to meet stability and strength requirements in design and operational conditions of loading.
18.3	"	Recommend application, noting that there should normally be separation between ballast and produced oil (crude) tanks and pumping systems, but temporary cross-connection may be permitted for the duration of transfer operations. In such exceptional cases where sea water is introduced into produced oil tanks for the operational purposes listed above in relation to 15.2, it should be dealt with as provided for under that clause.
18.8.1 to 18.8.4	Requirements for oil tankers with dedicated clean ballast tanks	Recommend application similar to 18.1 to 18.9.
18.10.1	Existing oil tankers having special ballast arrangements	Recommend application to meet 18.2 and 18.3 as modified by these Guidelines.
18.10.2	"	Recommended application consistent with 18.3 and 35.2 as modified by these Guidelines.
18.10.3	"	Not applicable.
18.11	SBT for oil tankers $\geq 70,000$ DWT delivered after 31.12.79	Recommend application, subject to the conditions listed for 18.2 and 18.3.
18.12 to 18.15	Protective location of segregated ballast spaces	Not applicable. Refer to 19.3.1 for corresponding provisions in relation to both new purpose-built FPSOs/FSUs and other non-purpose-built FPSOs/FSUs.

Regulation	Subject	Basis of Application
19	Double hull and double bottom requirements for oil tankers delivered on or after 6.07.96	Not applicable, except as detailed below.
19.3.1 and 19.3.6	"	Recommend application to new purpose-built FPSOs/FSUs so as to provide protection against relatively low-energy collision. (NOTE: Appropriate measures should also be taken for other FPSOs/FSUs to address this collision hazard).
19.5	"	Applicable to the extent that the Guidelines referred to can be used to demonstrate equivalency with 19.3.1 and 19.3.6 as modified above.
19.7	"	Recommend application to new construction purpose-built FPSOs/FSUs and other FPSOs/FSUs which are arranged with a fore peak or collision bulkhead. Similarly, oil should not be held in integral tanks located at the stern in FPSOs/FSUs which may offload to a tanker moored astern or alongside of the FPSO/FSU.
19.8	"	Recommend application to new construction purpose built FPSOs/FSUs and other FPSOs/FSUs which may be modified to meet this regulation.
20 (as amended by resolution MEPC.111(50))	Double hull and double bottom requirements for oil tankers delivered before 6.07.96	Not applicable.
21	Prevention of pollution from oil tankers carrying heavy grade oil as cargo	Not applicable.
22	Pump-room bottom protection	Not applicable.
23	Accidental oil outflow performance	Not applicable.
24	Damage assumptions	Recommend application with regard to side damage only. It is recommended that protective measures, such as fendering, be used to minimize side impact damage such as that which might be experienced during offloading and supply vessel berthing operations. Such protection, however, should not be considered to reduce the minimum transverse extent of side penetration damage.
25	Hypothetical outflow of oil	Recommend application for side damages only in accordance with 24 above.
26	Limitation of size and arrangement of cargo tanks	Recommend application based on 24 and 25 above.

Regulation	Subject	Basis of Application
27	Intact stability	Recommend application.
28.1 to 28.5	Subdivision and damage stability	Recommend application only in respect of side damage in accordance with 24 above.
28.6	Stability instrument	Recommend application. ²
28.7	Damage assumptions for oil tankers >=20,000 DWT delivered on or after 6.07.96	Not applicable.
29	Slop tanks	Applies.
30.1	Pumping, piping and discharge arrangement	Applies, except that manifold is to be provided in at least one position on the FPSO/FSU.
30.2	"	Not applicable for FPSOs.
30.3 to 30.7	"	Recommend application, particularly for management of contaminated sea as per Reg.18.3.
31	Oil discharge monitoring and control system	Applies only to tank cleanings and contaminated sea water (refer Art. 2(3)(b)(ii), Reg. 39 and UI 67) and should be read in light of Reg. 34. Not required where all oily mixtures are discharged to shore.
32	Oil/water interface detector	Applies only to tank cleanings and contaminated sea water (refer Art. 2(3)(b)(ii), Reg. 39 and UI 67) and should be read in light of Reg. 34. Not required where all oily mixtures are discharged to shore.
33	Crude oil washing requirements	COW system should be fitted unless produced oil characteristics are not suitable for COW.
34	Control of discharge of oil	Applicable as detailed below.
34.1	Discharges outside special areas	Recommended application whenever the FPSO/FSU is not at its operating station.
34.2	"	Applies.
34.3 to 34.5	Discharges in special areas	Apply.
34.6	Oil tankers <150 GT	Recommend application if FPSO/FSU is less than 150 GT.
34.7 to 34.9	General requirements	Apply.
35	Crude oil washing operations	Recommended application to any produced oil tanks used for water ballast as water ballast is subject to different discharge requirements than produced water. COW O&E Manual is to be provided for any COW system fitted.
36	Oil Record Book Part II	Part II should be applied in principle as part of oil production management system when on station, noting that this function must be complied with on voyage.

² If an Administration decides to apply these provisions to FPSOs and FSUs, it is invited to notify all parties involved so that a sufficient amount of time is allowed for the provisions to be complied with, which should be at least one year from the date of notification.

Regulation	Subject	Basis of Application
37.1 to 37.3	SOPEP	Applies in respect of SOPEP. However, contingency plan in accordance with requirements of OPRC Art 3(2) may be accepted under UI 65 as meeting this requirement. In such cases a separate SOPEP in accordance with the MARPOL format is not required. This acceptance of the contingency plan does not apply to a disconnectable FPSO/FSU unless that plan remains applicable when the FPSO/FSU is not connected to the riser.
37.4	Access to stability and residual strength calculation programmes	Applicable.
38	Reception facilities	FPSOs/FSUs should not be considered as offshore terminals and should not receive dirty ballast or slops from offload tankers.
39	Special requirements for fixed or floating platforms	Applies, subject to UI 67.
40	Scope of application (for chapter 8 – Prevention of pollution during transfer of oil cargo between oil tankers at sea)	The regulations contained in this chapter shall not apply to oil transfer operations associated with fixed or floating platforms including drilling rigs; floating production, storage and offloading facilities (FPSOs) used for the offshore production and storage of oil; and floating storage units (FSUs) used for the offshore storage of produced oil.
41	General rules on safety and environmental protection	Not applicable (in chapter 8).
42	Notification (for chapter 8)	Not applicable (in chapter 8).
43	Special requirements for the use or carriage of oils in the Antarctic area	Applies.
44	Application (for chapter 10 – Verification of compliance with the provisions of this Convention)	Applies.
45	Verification of compliance	Applies.

Regulation	Subject	Basis of Application
46	Definitions (for chapter 11 – International Code for ships operating in polar waters)	Applies.
47	Application and requirements	Applies.

ANNEX 2

RECORD OF CONSTRUCTION AND EQUIPMENT FOR FPSOs AND FSUs

In respect of the provisions of resolution MEPC.311(73) "Guidelines for the application of MARPOL Annex I³ requirements to FPSOs and FSUs", hereafter referred to as the "Guidelines".

Notes:

- 1 This form should be used for Floating Production Storage and Offloading facilities (FPSOs) and Floating Storage Units (FSUs) to which regulation 39 of Annex I of the Convention applies.
- 2 This Record should be permanently attached to the IOPP Certificate. The IOPP Certificate should be available on board the ship at all times.
- 3 If the language of the original Record is neither English nor French nor Spanish, the text should include a translation into one of these languages.
- 4 Entries in boxes shall be made by inserting either a cross (x) for the answers "yes" and "applicable" or a dash (-) for the answers "no" and "not applicable" as appropriate.
- 5 Unless otherwise stated, regulations mentioned in this Record refer to regulations of the revised Annex I of the Convention as implemented under the Guidelines and resolutions refer to those adopted by the International Maritime Organization.

1. Particulars of ship

- 1.1 Name of ship
.....
- 1.2 Distinctive number or letters
.....
- 1.3 IMO number (if applicable)
.....
- 1.4 Port of registry (if applicable)
.....
- 1.5 Gross tonnage (if applicable)
.....
- 1.6 Produced liquids holding capacity of ship (m³)
- 1.7 Deadweight of ship(tonnes) (regulation 1.23)
- 1.8 Length of ship (m) (regulation 1.19)
- 1.9 Operating station (lat/long)
.....
- 1.10 Coastal State
.....

³ Annex I of International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, hereafter referred to as the "Convention".

- 1.11 Date of build:
- 1.11.1 Date of building contract
- 1.11.2 Date on which keel was laid or ship was at a similar stage of construction
- 1.11.3 Date of delivery
- 1.12 Conversion to FPSO/FSU (if applicable):
- 1.12.1 Date of conversion contract
- 1.12.2 Date on which conversion was commenced
- 2. Equipment for the control of oil discharge from machinery space bilges and oil fuel tanks (regulations 14, 15 and 34)**
- 2.1 Carriage of ballast water in oil fuel tanks:
- 2.1.1 The ship may under normal conditions carry ballast water in oil fuel tanks
- 2.2 Type of oil filtering equipment fitted:
- 2.2.1 Oil filtering (15 ppm) equipment (regulation 14.6)
- 2.2.2 Oil filtering (15 ppm) equipment with alarm and automatic stopping device (regulation 14.7)
- 2.3 Approval standards:⁴
- 2.3.1 The separating/filtering equipment:
- .1 has been approved in accordance with resolution A.393(X);
- .2 has been approved in accordance with resolution MEPC.60(33);
- .3 has been approved in accordance with resolution MEPC.107(49);
- .4 has been approved in accordance with resolution A.233(VII);
- .5 has been approved in accordance with national standards not based upon resolutions A.393(X) or A.233(VII);
- .6 has not been approved;

⁴ Refer to the *Recommendation on international performance and test specifications of oily-water separating equipment and oil content meters* adopted by the Organization on 14 November 1977 by resolution A.393(X), which superseded resolution A.233(VII). Further reference is made to the *Guidelines and specifications for pollution prevention equipment for machinery space bilges* adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1993, superseded resolutions A.393(X) and A.444(XI) and the revised *Guidelines and specifications for pollution prevention equipment for machinery spaces of ships* adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.107(49) which, effectively on 1 January 2005, superseded resolutions MEPC.60(33), A.393(X) and A.444(XI).

2.3.2 The process unit has been approved in accordance with resolution A.444(XI)

2.3.3 The oil content meter:

.1 has been approved in accordance with resolution A.393(X);

.2 has been approved in accordance with resolution MEPC.60(33);

.3 has been approved in accordance with resolution MEPC.107(49);

2.4 Maximum throughput of the system is m³/h

2.5 Waiver of regulation 14:

2.5.1 The requirements of regulations 14.1 and 14.2 are waived in respect of the ship:

.1 As the ship is provided with adequate means for disposal of oily residues in accordance with the Guidelines

.2 In accordance with regulation 14.5.1 the ship is engaged exclusively in operations within special area(s)
Name of special area(s)

2.5.2 The ship is fitted with holding tank(s) for the total retention on board of all oily bilge water as follows:

Tank identification	Tank location		Volume (m ³)
	Frames (from) - (to)	Lateral position	
Total volume:m ³			

3. Means for retention and disposal of oil residues (sludge) (regulation 12) and oily bilge water holding tank(s)⁵

3.1 The ship is provided with oil residue (sludge) tanks for retention of oil residues (sludge) on board as follows:

Tank identification	Tank location		Volume (m ³)
	Frames (from) – (to)	Lateral position	
Total volume:m ³			

⁵ Oily bilge water holding tank(s) are not required by the Convention, if such tank(s) are provided they should be listed in table 3.3.

- 3.2 Means for the disposal of oil residues (sludge) retained in oil residue (sludge) tanks:
- 3.2.1 Incinerator for oil residues (sludge)
- 3.2.2 Auxiliary boiler suitable for burning oil residues (sludge)
- 3.2.3 Facility for adding oil residues to production stream
- 3.2.4 Other acceptable means, state which
- 3.3 The ship is provided with holding tank(s) for the retention on board of oily bilge water as follows:

Tank identification	Tank location		Volume (m ³)
	Frames (from) – (to)	Lateral position	
Total volume:m ³			

3A. Oil fuel tank protection (regulation 12A)

- 3A.1 The ship is required to be constructed according to regulation 12A and complies with the requirements of:
- .1 Paragraph 7 or 8 (double side construction)
- .2 Paragraphs 6 and either 7 or 8 (double hull construction)
- .3 Paragraph 11 (accidental oil fuel outflow performance)
- 3A.2 The ship is not required to comply with the requirements of regulation 12A

4. Standard discharge connection (regulation 13)

- 4.1 The ship is provided with a pipeline for the discharge of residues from machinery bilges and sludges to reception facilities, fitted with a discharge connection

5. Construction (regulations 18, 26 and 28)

- 5.1 In relation to the application of regulation 18, the ship is:
- 5.1.1 Provided with SBT
- 5.1.2 Provided with COW
- 5.1.3 Provided with sufficient ballast capacity to meet stability and strength requirements

5.1.4 Provided with CBT

5.2 Segregated ballast tanks (SBT):

5.2.1 The ship is provided with SBT consistent with regulation 18

5.2.2 The ship is provided with SBT which includes tanks or spaces not used for oil outboard of all produced oil tanks

5.2.3 SBT are distributed as follows:

Tank	Volume (m ³)	Tank	Volume (m ³)
		Total volume m ³

5.3 Dedicated clean ballast tanks (CBT):

5.3.1 The ship is provided with CBT consistent with regulation 18.8

5.3.2 CBT are distributed as follows:

Tank	Volume (m ³)	Tank	Volume (m ³)
		Total volume m ³

5.3.3 The ship has been supplied with a valid Dedicated Clean Ballast Tank Operation Manual, which is dated

5.3.4 The ship has common piping and pumping arrangements for ballasting the CBT and handling produced oil

5.3.5 The ship has separate independent piping and pumping arrangements for ballasting the CBT

5.4 Crude oil washing (COW):

5.4.1 The ship is equipped with a COW system

5.4.2 The ship is equipped with a COW system consistent with regulations 33 and 35

5.4.3 The ship has been supplied with a valid Crude Oil Washing Operations and Equipment Manual which is dated

5.5 Limitation of size and arrangements of produced oil tanks (regulation 26):

-
- 5.5.1 The ship is constructed according to the provisions of regulation 26
- 5.6 Subdivision and stability (regulation 28):
- 5.6.1 The ship is constructed consistent with regulation 28
- 5.6.2 Information and data required under regulation 28.5 have been supplied to the ship in an approved form
- 5.6.3 The ship is constructed consistent with regulation 27
- 5.6.4 The ship is provided with an Approved Stability Instrument consistent with regulation 28.6
- 5.6.5 In place of an Approved Stability Instrument, consistent with regulation 3.6 stability is verified by the following means:
- .1 loading only to approved conditions defined in the stability information provided to the master in accordance with regulation 28.5
- .2 verification is made remotely by a means approved by the Administration
- .3 loading within an approved range of loading conditions defined in the stability information provided to the master in accordance with regulation 28.5
- .4 loading in accordance with approved limiting KG/GM curves covering all applicable intact and damage stability requirements defined in the stability information provided to the master in accordance with regulation 28.5
- 5.7 Double-hull/side construction:**
- 5.7.1 The ship is constructed consistent with regulation 19 as follows:
- .1 paragraph 3 (double-hull construction)
- .2 paragraphs 3.1 and 3.6 (double sides)
- .3 paragraph .5 (alternative method approved by the Marine Environment Protection Committee)
- 5.7.2 The ship is constructed consistent with regulation 19.6
- 6. Retention of oil on board (regulations 29, 31 and 32)**
- 6.1 Oil discharge monitoring and control system:

- 6.1.1 The ship comes under category oil tanker as defined in resolution A.496(XII) or A.586(14)⁶ (*delete as appropriate*)
- 6.1.2 The system comprises:
- .1 control unit
 - .2 computing unit
 - .3 calculating unit
- 6.1.3 The system is:
- .1 fitted with a starting interlock
 - .2 fitted with automatic stopping device
- 6.1.4 The oil content meter is approved under the terms of resolution A.393(X) or A.586(14) or MEPC.108(49)⁷ (*delete as appropriate*) suitable for crude oil
- 6.1.5 The ship has been supplied with an operations manual for the oil discharge monitoring and control system
- 6.2 Slop tanks:
- 6.2.1 The ship is provided with dedicated slop tank(s) with the total capacity of m³, which is. % of the oil carrying capacity, in accordance with:
- .1 regulation 29.2.3
 - .2 regulation 29.2.3.1
 - .3 regulation 29.2.3.2
 - .4 regulation 29.2.3.3
- 6.2.2 Produced oil tanks have been designated as slop tanks
- 6.3 Oil/water interface detectors:
- 6.3.1 The ship is provided with oil/water interface detectors approved under the terms of resolution MEPC.5(XIII)

⁶ FPSOs and FSUs the keels of which are laid, or which are at a similar stage of construction, on or after 2 October 1986, should be fitted with a system approved under resolution A.586(14).

⁷ For oil content meters installed on tankers built prior to 2 October 1986, refer to the *Recommendation on international performance and test specifications for oily-water separating equipment and oil content meters* adopted by the Organization by resolution A.393(X). For oil content meters as part of discharge monitoring and control systems installed on tankers built on or after 2 October 1986, refer to the *Guidelines and specifications for oil discharge monitoring and control systems for oil tankers* adopted by the Organization by resolution A.586(14). For oil content meters as part of discharge monitoring and control systems installed on oil tankers built on or after 1 January 2005, refer to the revised *Guidelines and specifications for oil discharge monitoring and control systems for oil tankers* adopted by the Organization by resolution MEPC.108(49).

6.4 Waiver of regulation:

6.4.1 The requirements of regulations 31 and 32 are waived in respect of the ship as follows:

.1 The ship is engaged exclusively in operations within special area(s) (regulation 3.5)

Name of special area(s).....

.2 The ship is provided with adequate means of disposal of contaminated sea water

a. sent ashore

b. incinerated

c. added to the production stream

7. Pumping, piping and discharge arrangements
(regulation 30)

7.1 The overboard discharge outlets for segregated ballast are located:

7.1.1 Above the waterline

7.1.2 Below the waterline

7.2 The overboard discharge outlets, other than the discharge manifold, for clean ballast are located:⁸

7.2.1 Above the waterline

7.2.2 Below the waterline

7.3 The overboard discharge outlets, other than the discharge manifold, for dirty ballast water or oil-contaminated water from produced oil tank areas are located:

7.3.1 Above the waterline

7.3.2 Below the waterline in conjunction with the part flow arrangements consistent with regulation 30.6.5

7.3.3 Below the waterline

⁸ Only those outlets which can be monitored are to be indicated.

7.4 Discharge of oil from produced oil pumps and oil lines (regulations 30.4 and 30.5):

7.4.1 Means to drain all produced oil pumps and oil lines at the completion of produced oil discharge:

- .1 drainings capable of being discharged to a produced oil tank or slop tank
- .2 for discharge a special small-diameter line is provided

8. Shipboard oil pollution emergency plan
(regulation 37)

8.1 The ship is provided with a shipboard oil pollution emergency plan in compliance with regulation 37.1

8.2 The ship is provided with an oil pollution emergency plan approved in accordance with procedures established by as the coastal State in compliance with the unified interpretation of regulation 37.1

8.3 The ship is provided with a contingency plan in accordance with requirements of OPRC Art. 3(2) accepted in accordance with regulation 37

9. Surveys

9.1 Records of surveys in accordance with resolution A.1049(27), as amended maintained on board

9.2 In-water surveys in lieu of dry-docking authorized as per documentation

10. Equivalentents

10.1 Equivalentents have been approved by the Administration for certain requirements of the guidelines on those items listed under paragraph(s) of this Record

11. Compliance with part II-A – chapter 1 of the Polar Code

11.1 The ship is in compliance with additional requirements in the environment-related provisions of the introduction and section 1.2 of chapter 1 of part II-A of the Polar Code

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at

(Place of issue of the Record)

.....
*(Signature of duly authorized official
issuing the Record)*

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

ANNEX 15

DRAFT AMENDMENTS TO MARPOL ANNEXES I, II AND V

(Electronic Record Books)

MARPOL ANNEX I

REGULATIONS FOR THE PREVENTION OF POLLUTION BY OIL

Regulation 1 – Definitions

1 A new paragraph 39 is added as follows:

"39 Electronic Record Book means a device or system, approved by the Administration, used to electronically record the required entries for discharges, transfers and other operations as required under this Annex in lieu of a hard copy record book."

Regulation 17 – Oil Record Book Part I – Machinery space operations

2 The second sentence of paragraph 1 is replaced by the following:

"The Oil Record Book, whether as a part of the ship's official log-book, as an electronic record book which shall be approved by the Administration taking into account the Guidelines developed by the Organization* or otherwise, shall be in the form specified in appendix III to this Annex."

3 In the second sentence of paragraph 4, after the words "each completed page", the words "or group of electronic entries" are inserted.

Regulation 36 – Oil Record Book Part II – Cargo/ballast operations

4 The second sentence of paragraph 1 is replaced by the following:

"The Oil Record Book Part II, whether as a part of the ship's official logbook, as an electronic record book which shall be approved by the Administration taking into account the Guidelines developed by the Organization*, or otherwise, shall be in the Form specified in appendix III to this Annex."

5 In the second sentence of paragraph 5, after the words "each completed page", the words "or group of electronic entries" are inserted.

* Refer to the *Guidelines for the use of electronic record books under MARPOL*, adopted by resolution MEPC...(…)."

MARPOL ANNEX II

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

Regulation 1 – Definitions

6 A new paragraph 22 is added as follows:

"22 *Electronic Record Book* means a device or system, approved by the Administration, used to electronically record the required entries for discharges, transfers and other operations as required under this Annex in lieu of a hard copy record book."

Regulation 15 – Cargo Record Book

7 The existing paragraph 1 is replaced by the following:

"Every ship to which this Annex applies shall be provided with a Cargo Record Book, whether as a part of the ship's official logbook, as an electronic record book which shall be approved by the Administration taking into account Guidelines developed by the Organization*, or otherwise, in the form specified in appendix 2 to this Annex."

8 In the first sentence of paragraph 4, after the words "each page", the words "or group of electronic entries" are inserted.

MARPOL ANNEX V

REGULATIONS FOR THE PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS

Regulation 1 – Definitions

9 A new paragraph 19 is added as follows:

"19 *Electronic Record Book* means a device or system, approved by the Administration, used to electronically record the required entries for discharges, transfers and other operations as required under this Annex in lieu of a hard copy record book."

Regulation 10 – Placards, garbage management plans and garbage record-keeping

10 The second sentence of the chapeau of paragraph 3 is replaced by the following:

"The Garbage Record Book, whether as a part of the ship's official log-book, or as an electronic record book which shall be approved by the Administration taking into account the Guidelines developed by the Organization*, or otherwise, shall be in the form specified in appendix II to this Annex:"

11 In the second sentence of paragraph 3.1, after the words "each completed page", the words "or group of electronic entries" are inserted.

* Refer to the *Guidelines for the use of electronic record books under MARPOL*, adopted by resolution MEPC...(..)."

ANNEX 16

STATUS REPORT OF THE OUTPUTS OF MEPC FOR THE 2018-2019 BIENNIUM

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.2	Input on identifying emerging needs of developing countries, in particular SIDS and LDCs to be included in the ITCP	Continuous	TCC	MSC / MEPC / FAL / LEG		Ongoing		MEPC 72/17, section 12; and MEPC 73/19, section 13
1. Improve implementation	1.4	Analysis of consolidated audit summary reports	Annual	Assembly	MSC / MEPC / LEG / TCC / III	Council	Completed		MEPC 72/17, par. 2.8.2; and C 120/D, pars. 7.1 and 7.2
1. Improve implementation	1.5	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC / MEPC	III		Completed		MEPC 72/17, par. 2.7.5
1. Improve implementation	1.7	Identify thematic priorities within the area of maritime safety and security, marine environmental protection, facilitation of maritime traffic and maritime legislation	Annual	TCC	MSC / MEPC / FAL / LEG		Completed		MEPC 72/17, section 12; and MEPC 73/19, section 13
1. Improve implementation	1.9	Report on activities within the ITCP related to the OPRC Convention and the OPRC-HNS Protocol	Annual	TCC	MEPC		Completed		MEPC 72/17, section 12; and MEPC 73/19, section 13

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.11	Revised guidelines for the application of MARPOL Annex I requirements to FPSOs and FSUs	2019	MEPC	PPR		Completed		MEPC 70/18, par. 15.5; PPR 5/24, section 14, par. 24.2.15 and annex 11; and MEPC 73/19, par. 11.15 and annex 14
1. Improve implementation	1.12	Review of the 2015 Guidelines for exhaust gas cleaning systems (resolution MEPC.259(68))	2019	MEPC	PPR		In progress		MEPC 69/21, pars. 19.4 and 19.5 ; PPR 5/24, section 11; and MEPC 73/19, pars. 5.10 to 5.13
1. Improve implementation	1.13	Guide on practical methods for the implementation of the OPRC Convention and the OPRC-HNS Protocol	2019	MEPC	PPR		In progress		MEPC 70/18, par. 15.7; and PPR 5/24, section 17
1. Improve implementation	1.14	Revised guidance on ballast water sampling and analysis	2019	MEPC	PPR	III	In progress		MEPC 68/21, pars. 7.14 and 17.26; MEPC 70/18, par. 4.47; MEPC 71/17, para. 4.45; PPR 5/24, section 5; and MEPC 72/17, par. 4.54

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.15	Revised guidance on methodologies that may be used for enumerating viable organisms	2019	MEPC	PPR		In progress		MEPC 71/17, par. 4.54; and PPR 5/24, section 6
1. Improve implementation	1.16	Updated IMO Dispersant Guidelines (part IV)	2019	MEPC	PPR		Completed		PPR 4/21, section 13; and PPR 5/24, section 16, pars. 24.2.16 to 24.2.17 and annex 12; MEPC 73/19, par. 11.16
1. Improve implementation	1.17	Consistent implementation of regulation 14.1.3 of MARPOL Annex VI	2019	MEPC	PPR		In progress		MEPC 71/17, par. 14.27; PPR 5/24, section 13; MEPC 72/17, pars. 5.2 to 5.11, 5.41 to 5.43, and annex 10; and MEPC 73/19, pars. 5.17 to 5.36
1. Improve implementation	1.18	Measures to ensure quality of fuel oil for use on board ships	2019	MEPC			In progress		MEPC 72/17, pars. 5.12 to 5.18 and 5.44 to 5.45; and MEPC 73/19, pars. 5.37 to 5.41, and pars. 5.76 and 5.77

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.24	Revision of certification requirements for SCR systems under the NO _x Technical Code 2008	2018	MEPC	PPR		Completed		MEPC 70/18, par. 15.15; MEPC 71/17, pars. 5.8 and 14.31, and resolution MEPC.291(71); PPR 5/24, section 10, pars. 24.2.10/11 and annexes 8 and 9; MEPC 73/19, pars. 5.7 to 5.9
1. Improve implementation	1.25	Guidelines for the discharge of exhaust gas recirculation bleed-off water	2018	MEPC	PPR		Completed		MEPC 71/17, pars 5.4 to 5.7; and PPR 5/24, section 9, pars. 24.2.8 to 24.2.9 and annex 7; and MEPC 73/19, pars. 5.4 to 5.6, 5.77, and annex 3

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.26	Amendments to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants (resolution MEPC.227(64)) to address inconsistencies in their application	2020	MEPC	PPR		No work undertaken		MEPC 71/17, pars.14.8 and 14.9; MEPC 72/17, par.15.10; and MEPC 73/19, par. 15.19
Notes: The output has been placed on the provisional agenda for PPR 6 to start the work.									
1. Improve implementation	1.27	Review of the BWM Convention based on data gathered in the experience-building phase	2023	MEPC					MEPC 73/19, par. 15.10.2
Note: Pending endorsement by C 121, this output has been placed on the 2018-2019 biennial agenda.									
1. Improve implementation	1.28	Urgent measures emanating from issues identified during the experience-building phase of the BWM Convention	2023	MEPC					MEPC 73/19, par. 15.10.3
Note: Pending endorsement by C 121, this output has been placed on the 2018-2019 biennial agenda									
2. Integrate new and advancing technologies in the regulatory framework	2.2	Approved ballast water management systems which make use of Active Substances, taking into account recommendations of the GESAMP-BWWG	Annual	MEPC			Completed		MEPC 72/17, section 4; and MEPC 73/19, section 4

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
2. Integrate new and advancing technologies in the regulatory framework	2.13	Review of the IBTS Guidelines and amendments to the IOPP Certificate and Oil Record Book	2019	MEPC	PPR		In progress		MEPC 70/18, par. 15.12; and PPR 5/24, section 15
2. Integrate new and advancing technologies in the regulatory framework	2.14	Amendments to regulation 14 of MARPOL Annex VI to require a dedicated sampling point for fuel oil	2019	MEPC	SSE	PPR	In progress		MEPC 70/18, par. 15.10; and PPR 5/24, section 12
2. Integrate new and advancing technologies in the regulatory framework	2.17	Consideration of development of goal-based ship construction standards for all ship types	2018	MSC / MEPC			No work requested by MSC		
2. Integrate new and advancing technologies in the regulatory framework	2.18	Standards for shipboard gasification of waste systems and associated amendments to regulation 16 of MARPOL Annex VI	2019	MEPC	PPR		In progress		MEPC 70/17, paragraph 15.17; PPR 5/24, section 8; MEPC 72/17, par. 15.10
2. Integrate new and advancing technologies in the regulatory framework	2.19	Amendment of annex 1 to the AFS Convention to include controls on cybutryne, and consequential revision of relevant guidelines	2020	MEPC	PPR		In progress		MEPC 71/17, paragraph 14.3; and PPR 5/24, section 19 and par. 24.2.25; and MEPC 73/19, pars. 15.12 to 15.15

Notes: MEPC 73 agreed to rename output 2.19 as above and extend the TCY of the output to 2020.

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
3. Respond to climate change	3.1	Treatment of ozone-depleting substances used by ships	Annual	MEPC			Completed		MEPC 72/17, pars. 5.19 and 5.20
3. Respond to climate change	3.2	Further development of mechanisms needed to achieve the limitation or reduction of CO ₂ emissions from international shipping	Annual	MEPC			Completed		MEPC 72/14, sections 6 and 7, and annex 11; and MEPC 73/19, sections 6 and 7, and annex 9
3. Respond to climate change	3.3	Impact on the Arctic of emissions of black carbon from international shipping	2019	MEPC	PPR		In progress		MEPC 71/17, paragraph 5.3; PPR 5/24, section 7 and par. 24.2.7; and MEPC 73/19, par. 5.3
3. Respond to climate change	3.4	Promotion of technical cooperation and transfer of technology relating to the improvement of energy efficiency of ships	2019	MEPC			In progress		MEPC 72/17, section 12; and MEPC 73/19, section 13
3. Respond to climate change	3.5	Revision of guidelines concerning EEDI and SEEMP	2019	MEPC			In progress		MEPC 72/17, sections 5 and 6; and MEPC 73/19, sections 5 and 6

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
3. Respond to climate change	3.6	EEDI reviews required under regulation 21.6 of MARPOL Annex VI	2019	MEPC			In progress		MEPC 72/17, pars. 5.24 to 5.33, 3.50 to 3.51, and annex 6; and MEPC 73/19, section 5 and annexes 5, 6 and 7
3. Respond to climate change	3.7	Further technical and operational measures for enhancing the energy efficiency of international shipping	2019	MEPC			In progress		MEPC 72/17, section 6; and MEPC 73/19, section 6
4. Engage in ocean governance	4.1	Identification and protection of Special Areas, ECAs and PSSAs	Continuous	MEPC	NCSR		Ongoing		MEPC 72/17, section 8; and MEPC 73/19, section 10
4. Engage in ocean governance	4.2	Input to the ITCP on emerging issues relating to sustainable development and achievement of the SDGs	2019	TCC	MSC / FAL / LEG / MEPC		In progress		MEPC 72/17, section 12; and MEPC 73/19, section 13
4. Engage in ocean governance	4.3	Follow-up work emanating from the Action Plan to address marine plastic litter from ships	2020	MEPC	PPR		In progress		MEPC 72/17, pars. 15.2 to 15.6; and MEPC 73/19, section 8 and annex 10
Note: MEPC 73 adopted the <i>Action plan to address marine plastic litter from ships</i> (resolution MEPC.310(73)) and agreed to change the title of output 4.3 as above.									

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
6. Ensure regulatory effectiveness	6.1	Unified interpretation of provisions of IMO safety, security and environment-related conventions	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MEPC 71/17, paragraphs 4.80, 5.22, 9.10, 10.7 and annexes 8 and 20; PPR 5/24, section 20; MEPC 72/17, pars 3.10 to 3.13, 3.56 to 3.57 and annex 9; and MEPC 73/19, pars. 4.27 to 4.29, 5.14 to 5.16, 6.8 to 6.9, 6.16 and 15.8, and annex 8
6. Ensure regulatory effectiveness	6.3	Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code	Continuous	MEPC	PPR		Ongoing		MEPC 71/17, paragraphs 9.3 to 9.5; PPR 5/24, section 3; MEPC 72/17, par. 9.4; and MEPC 73/19, pars. 11.5 to 11.7, and annex 11.
6. Ensure regulatory effectiveness	6.4	Lessons learned and safety issues identified from the analysis of marine safety investigation reports	Annual	MSC / MEPC	III		Completed		III 5/15, section 4

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
6. Ensure regulatory effectiveness	6.5	Identified issues relating to the implementation of IMO instruments from the analysis of PSC data	Annual	MSC / MEPC	III		Completed		III 5/15, section 6
6. Ensure regulatory effectiveness	6.7	Consideration and analysis of reports on alleged inadequacy of port reception facilities	Annual	MEPC	III		Completed		III 5/15, section 3; and MEPC 73/19, pars. 8.3 and 8.11
6. Ensure regulatory effectiveness	6.8	Monitoring the worldwide average sulphur content of fuel oils supplied for use on board ships	Annual	MEPC			Completed		MEPC 72/17, pars. 5.21 to 5.23
6. Ensure regulatory effectiveness	6.10	Review of MARPOL Annex II requirements that have an impact on cargo residues and tank washings of high viscosity, solidifying and persistent floating products and associated definitions, and preparation of amendments	2019	MEPC	PPR		In progress		PPR 4/21, section 4; PPR 5/24, section 4; and MEPC 73/19, pars. 11.10 to 11.12, and annex 13
6. Ensure regulatory effectiveness	6.11	Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters	2019	MEPC	PPR		In progress		MEPC 71/17, paragraph 14.13; MEPC 72/17, section 11; and MEPC 73/19, section 9

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
6. Ensure regulatory effectiveness	6.13	Use of electronic record books	2018	MEPC	PPR		In progress		FAL.5/Circ.39/Rev.2; FAL 40/19, pars. 6.18 to 6.21; MEPC 70/18, par. 2.2; PPR 5/24, section 18 and pars. 24.2.18 to 24.2.23; and MEPC 73/19, pars. 11.17 to 11.32, and annexes 4, 6 and 15
7. Ensure organizational effectiveness	7.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		Ongoing		MEPC 72/17, par. 16.22; and MEPC 73/19, pars. 5.64 to 5.70, 6.1 to 6.5, and 11.4
7. Ensure organizational effectiveness	7.3	Analysis and consideration of reports on partnership arrangements for, and implementation of, environmental programmes	Annual	TCC	MEPC		Completed		MEPC 72/17, section 12; and MEPC 73/19, section 13
7. Ensure organizational effectiveness	7.9	Revised documents on organization and method of work, as appropriate	2019	Council	MSC / FAL / LEG / TCC / MEPC		Completed		MEPC 72/17, section 14; and MEPC 73/19, section 16

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
OW. Other work	OW.10	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Ongoing		MEPC 70/18, pars. 2.2, 5.18 to 5.20 and 15.20; MSC 97/22, paragraph 19.8; PPR 5/24, pars. 11.5, 13.18, 13.21, 18.15 and 18.16; III 5/15, section 5; and MEPC 73/19, pars. 3.8 and 11.30 to 11.33
OW. Other work	OW.13	Endorsed proposals for new outputs for the 2018-2019 biennium as accepted by the Committees	Annual	Council	MSC / MEPC / FAL / LEG / TCC		Completed		MEPC 72/17, section 15; and MEPC 73/19, section 15
OW. Other work	OW.16	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC	III		Completed		MEPC 72/17, pars. 7.4, 4.24 to 4.33; and III 5/15, section 8
OW. Other work	OW.19	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	III	CCC	Completed		CCC 5/13, section 9

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
OW. Other work	OW.23	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	2019	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	In progress		MEPC 72/17, sections 5 and 7; and MEPC 73/19, section 7
OW. Other work	OW.24	Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance	2019	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	In progress		MEPC 72/17, sections 5 and 7; and MEPC 73/19, section 13
OW. Other work	OW.49	Review the Model Agreement for the authorization of recognized organizations acting on behalf of the Administration	2018	MSC / MEPC	III		In progress		III 5/15, section 11

POST-BIENNIAL AGENDA OF MEPC

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)							
ACCEPTED POST-BIENNIAL OUTPUTS			Parent organ(s)	Associated organ(s)	Coordinating organ	Timescale	Reference
No.	Reference to strategic direction, if applicable	Description					
1	1. Improve implementation	Review of the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (resolution MEPC.207(62))	MEPC	PPR		2 sessions	MEPC 72/17, par.15.8
2	1. Improve implementation	Development of training provisions for seafarers related to the BWM Convention	MEPC	HTW		2 sessions	MEPC 73/19, par.15.10.1
Note: Pending endorsement by C 121, this output has been placed on the post-biennial agenda of the Committee.							
3	2. Integrate new and advancing technologies in the regulatory framework	Development of amendments to MARPOL Annex VI and the NO _x Technical Code on the use of multiple engine operational profiles for a marine diesel engine	MEPC	PPR		2 sessions	MEPC 73/19, par.15.18
Note: Pending endorsement by C 121, this output has been placed on the post-biennial agenda of the Committee.							
4	6. Ensure regulatory effectiveness	Development of amendments to regulation 19 of MARPOL Annex VI and development of an associated Exemption Certificate for the exemption of ships not normally engaged on international voyages	MEPC	III		2 sessions	MEPC 71/17, par.14.15
5	Other work	Recommendations related to navigational sonar on crude oil tankers	MSC / MEPC	SDC		1 session	MSC 91/22, par. 19.23

ANNEX 17

ITEMS TO BE INCLUDED IN THE AGENDAS OF MEPC 74 AND MEPC 75

No.¹	Item	MEPC 74 May 2019	MEPC 75 2020
1	Adoption of the agenda	X	X
2	Decisions of other bodies	X	X
3	Consideration and adoption of amendments to mandatory instruments	X [DG]	X [DG]
4	Harmful aquatic organisms in ballast water	X [RG]	X [RG]
5	Air pollution and energy efficiency	X [WG] ²	X [WG] ²
6	Further technical and operation measures for enhancing the energy efficiency of international shipping	X [WG] ²	X [WG] ²
7	Reduction of GHG emissions from ships	X [WG]	X [WG]
8	Follow-up work emanating from the Action Plan to address marine plastic litter from ships	X [WG]	-
9	Identification and protection of Special Areas, ECAs and PSSAs	X	X
10	Pollution prevention and response	X	X
11	Reports of other sub-committees	X	X
12	Technical cooperation activities for the protection of the marine environment	X	X
13	Capacity-building for the implementation of new measures	X	X
14	Work programme of the Committee and subsidiary bodies	X	X
15	Application of the Committees' method of work	X	X
16	Election of the Chair and Vice-Chair	X	-
17	Any other business	X	X
18	Consideration of the report of the Committee	X	X

¹ The numbering may not correspond to the number of the agenda item in the forthcoming sessions.

² The working group, if established under agenda item 5, may also cover agenda item 6.

ANNEX 18

STATEMENTS BY DELEGATIONS AND OBSERVERS*

ITEM 3.

Statement by the delegation of Ecuador

"Esta delegación considera que la propuesta de Bangladesh es coherente con la realidad pero merece una visión desde otro punto de vista. Creemos que estamos ante un escenario de no factibilidad de ejecutar una resolución de disminución del Azufre a menos 0,5% a marzo 2020, o no podrá ser ejecutada en su totalidad porque la oferta será enormemente insuficiente, lo que ahora no sabemos.

Es una sana decisión para el planeta, por supuesto, pero lo enunciado la Regla 14 como está, adolece de factibilidad.

Coincidimos con el criterio manifestado por la distinguida delegación de Perú en el punto del orden del día anterior, que no poseemos información del comportamiento que tendrá la oferta de combustibles limpios en el 2020, no solamente por costo, que se elevará exponencialmente, sino por la capacidad de refinamiento mundial para proveer esos combustibles. Estamos en un escenario de cambio del uso de combustibles fósiles a otras de fuentes renovables o al menos más limpias y esto no ha sido tampoco considerado.

Creo que debemos estar conscientes que si en realidad queremos saber si la intención es causar una conmoción y con qué propósito? , si es para acelerar el paso a fuentes de energía limpias, si es así, debemos estar consientes que esto es lo que queremos. El problema es que después de enero del 2020 vendrán las presiones y corremos el peligro de tener una magnífica resolución constante en la Regla 14, pero no ejecutada por la fuerza de las circunstancias. Me temo que nos veremos avocados a adoptar una posición reactiva, quizás ampliando los plazos nada más. Creemos que con más información podemos hacer algo mas en el 2020 que ampliar los plazos reactivamente.

Debemos saber si la capacidad de refinamiento se está modificando o no, eso lo podríamos saber si se cuantifican el número de refinerías que están modificando sus perfiles de refinamiento para entrar en la norma y en qué tiempo, así como debemos saber si las alternativas a combustibles fósiles serán económicamente viables, de manera de tener más opciones en el 2020 cuando no se cumpla

Debemos saber al 2020 qué porcentaje de reducción de S es factible, de acuerdo a la capacidad instalada de refinamiento y en el 2020 pensar en una reducción gradual en base a la disponibilidad de combustibles con bajo S.

Nos parece que debemos hacer algo más para hacerla factible y para ello necesitamos tiempo."

* Statements have been included in this annex as provided by delegations/observers, in the order in which they were given, sorted by agenda item, and in the language of submission (including translation into any other language if such translation was provided). Statements are accessible in all official languages on audio file at: <http://docs.imo.org/Meetings/Media.aspx>

Statement by the delegation of India

"We thank Bangladesh for their submission MEPC 73/3/3 and support their proposal for postponing ban on carriage for following reasons:

1. Increasing concern about shortfall of middle distillates of 1 million barrels per day as estimated by International Energy Agency and corresponding increase in crude oil prices and price of middle distillates. Such high prices will be detrimental for our economy.
2. There is concern about safety aspects of blended residual fuels which the industry is yet to get a chance to try out on their ships.

We wish to elaborate on these two aspects.

It is now very clear that the vast majority of the ships will opt for marine gasoil or 0.5% compliant blends, which are based on distillates.

Economists at the International Energy Agency, have warned that these prices must increase twenty to thirty percent. Analysts at various consulting firms and investment banks have produced similar estimates.

While higher prices are worrisome, they should not by themselves lead to a major recession. After all, diesel fuel prices have increased more than thirty percent at various times this decade. However, these estimates assume that crude prices do not change. Indeed, the authors of a crucial IEA report, Oil 2018, specifically make this assumption.

Difficulties will arise because crude oil is not a homogeneous commodity.

Almost two-thirds of the world's crude oil production is in medium sour and sour grades that are at least 0.5 percent sulphur.

The best way for simple refineries to produce fuel with less sulfur is to buy and process crude that contains less sulfur, a shift that could change demand for different oil grades and lead to greater oil market volatility.

While many world refineries can produce low-sulfur diesel fuel from heavy sour crudes, a large number have not been equipped to do this yet and thus cannot help in meeting the IMO 2020 requirements. There will be a bidding war for sweet crude and price of that will soar. If nothing changes, the 2020 diesel and gasoil crisis will occur because as many as half of world refineries cannot produce fuel that meets the new regulation.

The last time diesel prices shot up as much as the IEA is predicting was mid-2008. At that time crude oil price had hit a record high of US\$145 a barrel.

Diesel, marine gasoil, and jet fuel—collectively known as middle distillates—account for more than a third of global oil consumption. Used in road transportation, shipping, aviation, and manufacturing, middle distillates are more closely linked to economic growth than any other section of the oil products market.

The new rules for the global oil market will disrupt fuel supplies to all modes of transport and cause economic hardships for our economy.

The second issue is related to safety aspects of blended 0.5% sulphur fuels that will come into the market.

Currently most bunker suppliers are developing blended residual fuels for ships due to price consideration and making optimum use of their refinery streams. Refineries around the world are taking a wide range of approaches in choosing blending components to meet the 0.5% sulphur limit. These fuels will have the low sulphur content of Distillates fuels but higher viscosity and lubricity of residual fuels.

These fuels are not available as yet and there are several safety concerns with their use as has been tabled by several papers to Intersessional working Group on Air Pollution held in July 2018 as follows:

- Cold flow properties
- Stability
- Viscosity
- Acid number
- Flash point
- Ignition quality
- Cat fines
- Compatibility issues

Under these circumstances it will be prudent to postpone the ban on carriage to a later date.

We request that this statement be reflected in the report of the Committee.

Thank you Chairman."

Statement by the delegation of Malaysia

"Thank you Chair,

We wish to thank Bangladesh for their paper MEPC73/3/3 as well as India and others for their comments.

Sir,

We respect that one of the aspiration of the low sulphur fuel is to mitigate and further manage the emission ambitions namely SO_x and NO_x. This was of course contingent that the fuel is available without hindering the movement of trade globally. We believe that there is vital balance between both these goals. Further sir, current infrastructure, availability and capacity is one of the few concerns in addition of safety concerns for these blended fuels will also need to be addressed concurrently and kept in mind during the amendments of Regulation 14. In conclusion we wish to support the paper by Bangladesh and lend our voice to the concerns raised by other delegation.

We wish that our statement is annexed to the report of this committee.

Thank You Sir."

Statement by the delegation of the Russian Federation

"В первую очередь хотелось бы поблагодарить Бангладеш за представленные комментарии на документ MEPC 73/3, которые мы поддерживаем.

Уважаемые коллеги, действительно многие государства, в том числе Российская Федерация и другие страны - крупнейшие производители и экспортеры нефти нефтепродуктов, в свое время выступали за менее жесткий график вступления в силу ограничения по сере. Упоминалась крайне вероятная перспектива недостаточности низкосернистого топлива к 2020-му году, а также неизбежный и резкий рост стоимости топлива в условиях дефицита. Однако, эти голоса не были услышаны в ИМО, и КЗМС-70 большинством голосов выступавших делегаций принял решение о дате 1 января 2020 г.

В этом году, опять же, не прислушиваясь к голосам некоторых стран, в особенности государств-производителей нефти, Комитет одобрил поправки в МАРПОЛ, запрещающие перевозку субстандартного топлива в качестве топлива на судах практически одновременно с введением ограничения по сере.

И теперь, чем ближе подходит 1 января 2020 г., тем больше мы слышим голосов тех, кто предлагает, пока еще не поздно, подходить к вопросу более взвешенно.

Мы полагаем, что нет острой необходимости вводить запрет на перевозку субстандартного топлива в качестве топлива непосредственно сразу после ввода глобального ограничения по сере, то есть с 1 марта 2020 г.

Бангладеш в п. 8 документа абсолютно прав в том, что такой запрет имеет смысл только тогда, когда обеспечены экономическая доступность и достаточное предложение низкосернистого топлива, а также прояснены вопросы, связанные с безопасностью использования такого топлива, как недавно говорили наши коллеги из Индии и Саудовской Аравии.

Также хотели бы в этой связи обратить внимание, и наша делегация говорила об этом на КЗМС-70, что до сих пор большое количество государств не является сторонами Приложения VI МАРПОЛ и не связано обязательствами, которые содержатся в нем.

Хотели бы очередной раз подчеркнуть, что наша общая цель - универсальное применение требований, разрабатываемых под эгидой ИМО. Особенно это важно для вопросов защиты окружающей среды, защиты воздуха. Ситуация, когда экологические стандарты соблюдают только часть государств, в то время как другие освобождены от этих обязательств, сводит на нет эффективность любых глобальных мер.

В этой связи Российская Федерация хотела бы призвать наших коллег, которые не присоединились к Протоколу 1997 г. сделать это как можно скорее."

"First and foremost we would like to thank Bangladesh for the comments to document MEPC 73/3. We support position of Bangladesh.

Distinguished colleagues, indeed, many states, including the Russian Federation and other major oil producing and exporting countries at that time called for a less stringent timeline for the entry into force of the sulphur cap. The extremely likely prospect of low-sulphur fuel insufficiency by 2020 was mentioned, as well as the inevitable and sharp growth in the cost of fuel given the shortage of it. However, these voices were not heard in the IMO, and MEPC-70 by a majority of the delegations who took the floor decided on the date January 1, 2020.

This year, again, not listening to the voices of some countries, especially oil-producing countries, the Committee approved the amendments to MARPOL prohibiting the transportation of substandard fuel as fuel on ships almost at the same time as the introduction of the sulphur cap.

And now, the closer we come to January 1, 2020, the more we hear the voices of those who offer, until it is not too late, to approach the issue in more balanced way.

We feel that there is no urgent need to impose a ban on the transportation of substandard fuel as fuel immediately after the introduction of the global sulphur cap, that is, from March 1, 2020.

Bangladesh in paragraph 8 of the document is absolutely right that such a ban only makes sense when economic availability and sufficient supply of low-sulphur fuel are ensured and the safety issues arising from the use of such fuel are clarified, as our colleagues from India and Saudi Arabia said recently.

Our delegation would also like to point out in this regard, as we also did at MEPC 70, that so far a large number of states are not parties to MARPOL Annex VI and are not bound by the obligations contained therein.

We would like to emphasize once again that our common goal is the universal application of the requirements developed under the aegis of IMO. This is especially important for environmental issues and air protection. The situation when environmental standards are met only by a part of the states, while others are free from these obligations, negates the effectiveness of any global measures.

In this regard, the Russian Federation would like to urge our colleagues from other countries who have not acceded to the 1997 Protocol to do so as soon as possible."

Statement by the delegation of Saudi Arabia

"شكرا" لك السيد الرئيس
الأعضاء الموقرون

إن المملكة العربية السعودية تؤيد الورقة المقدمة من بنجلاديش رقم MEPC 73/3/3 والدعم لهذه الورقة من قبل الهند وأندونيسيا وروسيا وغيرها.

وفيما يخص التعديلات المقترحة على الملحق السادس لإتفاقية ماربول على منع نقل الوقود الزيتي الغير متطابق بغرض إستعماله كوقود للمحركات على السفينة نفسها, فإن وجهة نظر المملكة العربية السعودية أن هذا المنع يجب أن يكون منسجما مع ما هو متفق عليه في المادة 14.1.3 الواردة في الملحق السادس لإتفاقية ماربول.

إن الخطوط التوجيهية حول إستعمال الوقود الزيتي ذات الكبريت المنخفض وكذلك معايير التفتيش لدولة الميناء يجب أن تتضمن الخطوات اللازمة لإدارة والتعامل مع أمور السلامة ذات العلاقة في حال دخل هذا التعديل حيز التنفيذ.

هناك تحديات معينة حول الإنتاج العالمي وتوزيع وإستعمال الوقود الزيتي ذات الكبريت المنخفض (أقل من 0.5%) والمنتج من دمج أنواع الوقود المختلفة, ومنه هذه التحديات: عدم الإستقرار, وعدم إنسجام كيميائي مما قد ينتج عنه إنخفاض مستوى درجة الإشتعال إلى درجة خارج النطاق المسموح به في إتفاقية سولاس, وهذا كله على سبيل الأمثلة. وأيضا" نشير إلى أمر هام جدا" وهو عدم وجود مواصفات فنية على الوقود المدمج حيث أن الجهة الدولية المعنية وهو المنظمة الدولية للمواصفات والمقاييس (ISO) أكدت عدم وجود المعايير والمواصفات اللازمة حاليا" وأن المنظمة الدولية للمواصفات والمقاييس لن يصدر عنها أي معايير أو مواصفات لهذا الوقود الزيتي قبل 1 يناير 2020.

مع الأخذ في الإعتبار أنه سيكون هناك إجتماع للجنة الفرعية للحماية والإستجابة للتلوث (PPR) في دورتها السادسة القادمة والتي سيقدم تقريرها إلى لجنة حماية البيئة (MEPC) في دورتها الرابعة والسبعون في عام 2019 فلن يكون بمقدور الدول الأعضاء إتخاذ أي قرار مناسب في إجتماع لجنة حماية البيئة (MEPC) في دورتها الثالثة والسبعون التي ستعقد في أواخر 2018 والتي من أهدافها تأكيد الموعد المقرر لتطبيق التعديلات المقترحة. إن المملكة العربية السعودية تقترح أن يتم تأجيل تطبيق التعديلات المقترحة حتى عام 2022 (مثال 1 يناير 2022) حتى يتسنى لفترة مناسبة لبناء الخبرات والتعامل مع ما سيحدث مع الوقود ذات الكبريت المنخفض الذي سيدخل حيز التطبيق في 1 يناير 2020 سواء أكانت التحديات تجارية أو تخص السلامة.

شكرا" لك السيد الرئيس ونود أن يتم إدراج مداخلتنا هذه في التقرير النهائي للجنة."

ITEM 5.

Statement by the observer of IACS

"Thank you, Chair.

Regarding paragraph 3.27 of paper MEPC 73/11, please be advised that following the consideration by PPR 5 of Revision 1 of IACS UI MPC 51 on engine test cycles as required by paragraph 3.2.1 of the NOx Technical Code 2008; IACS withdrew this revision of UI MPC51 on 8 June 2018. This was prior to its proposed application date of 1 July 2018. The consequence of this withdrawal is that, at this time, the original version of this IACS UI remains extant. However, the Committee is advised that UI MPC51 is currently under review and any substantive changes to it, as a conclusion of this ongoing work, will be communicated to the PPR Sub-Committee in the normal manner.

IACS would be grateful if this statement could be appended to the report of this meeting.

Thank you."

Statement by the delegation of the United States

"Thank you Mr. Chair.

We thank the submitters of document 73/5/14. We find the proposal in this document for and Experience Building Phase (EBP) worthy of serious consideration by this Committee in order to ensure the smooth and consistent implementation of Regulation 14.1.3 of Annex VI. We support this proposal.

First of all, we ALL need to note that this is NOT a proposal to delay or change the date of the 2020 sulfur standard. This is important and MUST be kept in mind.

The U.S. supports the developing an Experience Building Phase because it will bring transparency to the implementation of the 2020 sulfur standard. And it will help address concerns over fuel availability and compliance as well as concerns raised with respect to fuel safety and economic impacts of the 2020 sulfur standard. The 2020 sulfur cap will undoubtedly have impacts beyond the maritime transportation sector and we need to keep this in mind as we work for the smooth and consistent implementation of the 2020 sulfur standard.

The global economic impacts of the 2020 sulfur cap are likely to be substantial, with some projections suggesting that in 2020 alone the added cost to all global fuel markets will exceed \$100 billion. These costs are not isolated to the maritime industry – they will be felt in all forms of road, rail, marine and air transportation.

Simply put, the decisions we reach go far beyond maritime. A well thought out and well-structured experience building phase through its data collection and information sharing will allow all countries to be better informed as we move forward together to implement the 2020 sulfur standard.

We see the proposal for an experience building phase as being similar to what the U.S. went through when the North America ECA came into effect, but different in one important way, the scale and impact of the global sulfur cap. When the ECA came into effect the U.S. was faced with instances of ships being in non-compliance. We adopted an enforcement posture that considered all aspects of the situation before deciding on the action we needed to take. The difference here, is that instead of an ECA, which was localized to the U.S.; we are now facing the implementation of a global sulfur requirement. And the actions and situations from different regions or different locations in the world will have larger impacts. Being knowledgeable and aware of these actions can only help all countries as we collectively work to implement the 2020 sulfur cap.

We recognize that we don't have a lot of time. We need to complete work on an experience building phase at MEPC 74 in order to meet the 1 January 2020 date. Therefore, as pointed out by Marshall Islands, we should work intercessionally and we look forward to receiving submissions with concrete proposals to our next session and with proper focus within a working group at MEPC 74, we are confident that we will be able to complete our work at the next session.

Distinguished delegates, the U.S. urges the Committee to agree to the development of an experience building phase. We believe an experience building phase is an approach to consistently implementing the 2020 sulfur standard. It will undoubtedly assist the maritime industry achieve its lower sulfur standards while ensuring adequate consideration of environmental, safety and economic concerns.

Thank you Mr. Chair."

Statement by the delegation of Saudi Arabia

"شكرا" لك السيد الرئيس
الأعضاء الموقرون

إن المملكة العربية السعودية تؤيد الورقة المقدمة من جزر المارشال وجزر البهامس وبنما وليبيريا وغيرهم رقم 73/5/14 والدعم لهذه الورقة من قبل ..الولايات المتحدة الأمريكية والفلبين والمكسيك وغيرهم....

المملكة العربية السعودية ملتزمة بتطبيق الإتفاقية للحد من نسبة الكبريت في السفن إلى 0.5% في تاريخ 1 يناير 2020. ولكن يجب وجود خطوط توجيهية واضحة حول إستعمال الوقود الزيتي ذات الكبريت المنخفض وكذلك معايير التفتيش لدولة الميناء يجب أن تتضمن الخطوات اللازمة لإدارة والتعامل مع أمور السلامة ذات العلاقة.

وفي هذا الصدد ترحب المملكة العربية السعودية بأن مجموعة من الجهات ذات الإختصاص المشمولين في الورقة 17\5\73 قد اتفقت على إنشاء فريق فني سيتواصل من أجل وضع إرشادات عملية للسفن للتعامل مع الوقود الزيتي ذات الكبريت المنخفض.

السيد الرئيس الأعضاء الموقرون

إنه من الحكمة أن يتسنى إيجاد فترة مناسبة لبناء الخبرات والتعامل مع ما سيحدث مع الوقود ذات الكبريت المنخفض الذي سيدخل حيز التطبيق في 1 يناير 2020 سواء أكانت التحديات تجارية أو تخص السلامة أو غيرها .

شكرا" لك السيد الرئيس وسيرسل وفد المملكة العربية السعودية هذه المداخلة ليتم إدراج مداخلتنا هذه في التقرير النهائي للجنة."

Statement by the delegation of the Cook Islands

"Sir,

I understand that a decision, or is it conclusion, was made yesterday when, as a small delegation, we were not able to attend plenary as we were at the GHG WG finalising the report in which it is recognised that the impact on States, such as ours, must be taken into account when developing legislation.

I wish to make clear that a discussion on phase 3 requirements needed to have been preceded by a discussion on data. I do not wish to labour the point but the Initial IMO GHG Strategy identifies that the impacts on States, in particular, on SIDS and LDCs, need to be taken into account for all legislation. Without data, Parties to MARPOL Annex VI are unable to make a decision, in particular on SIDS. The decision made to amend the phase 3 requirements for feeder ships mean we have essentially shot ourselves in the foot as the smaller ships that our region is reliant on for essential services will be legislated out of business. A 40% reduction rate requirement applicable across the board is simply impossible.

We object in the strongest terms as it is the most essential mode for our islands. I am appalled and disappointed."

Statement by the observer of IACS

"Thank you, Chair.

IACS offers the following four comments to facilitate the Committee's consideration of the proposals in paper MEPC 73/5/5.

First, noting yesterday's discussions on the EEDI Phase 3 requirements for various ship types, data can only be provided for ships that have been built. In the current economic climate it is a fact that there has been a dearth of newbuildings in recent years, especially for some ship types.

Second, IACS understands that the earliest entry into force for making the reporting of EEDI data mandatory through an appropriate amendment to Chapter 4 of MARPOL Annex VI would be some time in 2020. Noting the primary reason for providing this information is to inform the reviews that are required by regulation 21.6 of MARPOL Annex VI, it is understood that the review of the last of the current EEDI phases – that is Phase 4 – will commence in November this year – which will be at least a year before the mandatory reporting requirement will enter into force.

Third, IACS believes such a mandatory reporting system would increase the administrative burden for all involved parties. Currently, IACS Members are collating and submitting this data to the IMO Secretariat in a 'flag neutral' and consolidated manner. If a mandatory reporting system is adopted, the data will need to be submitted, or at least controlled, on an individual flag State basis.

Finally, IACS Members confirm their commitment to provide the data as agreed by the Committee to inform the reviews required by regulation 21.6 of MARPOL Annex VI. IACS recognises that there have been some difficulties in providing this data by its Member Societies to the Organization.

Since the publication of paper MEPC 73/5/5, all IACS Members have conducted a thorough survey of the ships that need to be reported to the IMO Secretariat; and it is now understood

that the data on all ships that should have been reported to the IMO Secretariat has now been provided. The 'trigger' for providing this data is either the issuance of the IEEC to the ship, in instances when the IACS Member, acting as a recognised organization, issues this certificate; or the final verification of the EEDI calculations. The use of this 'trigger' is relevant when the differences in the number of ships reported to the IMO database, and those discussed in MEPC 73/5/5.

IACS, in consultation with the IMO Secretariat, has now agreed to harmonise the reporting provided by IACS Members. This harmonized and reporting system includes a fixed reporting timing of at least twice a year, i.e. the data from July to December in the previous year should be reported to the IMO by the end of January; and the data from January to June should be reported to the IMO by the end of July.

IACS believes that this new reporting protocol will facilitate the timely reporting of EEDI data and strengthen the current non-mandatory reporting scheme.

Thank you."

Statement by the delegation of Antigua and Barbuda

"Antigua and Barbuda wishes to thank the Chair and all the participants in the working group for their efforts.

Recalling the Decision on Wednesday reg. the EEDI Reduction rates concerning the individually discussed vessel types, particularly the one concerning Container Vessels, as then referred to the (AP&EE) WG, and recalling the relevant statements on Wednesday by Intertanko, WSC, but also the CSC and numerous member states, such as Japan, Liberia, later again Austria and then also by the Cook Islands yesterday, Antigua and Barbuda wish to emphasize as iterated also by you Chair, that, as a technical body, our Committee should base all its decisions on clear, scientific evidence and sufficient relevant data.

In respect to the general 40% reduction rate for all container vessels irrespective of their size, with the linear interpolation between 0-40 for vessels from 10-15000 DWT, reflected in the Annex 3 to WP7 we believe this is not the case, and thus the latter in particular should be reviewed again at MEPC 74.

It was our perception, that the former decision has been referred to the working group as general terms of reference, to elaborate further, but the outcome suggest no discussion was actually held.

In our view, irrespective of the actual level of ambition, and there is no doubt Antigua and Barbuda share a high level of ambition, all kind of shipping should bear it's fair share of efforts and burden, and thus a more elaborate categorization by vessel size seems appropriate, as it has been indicated by both environmental and industry stakeholders based on relevant data presented at this session.

This under particular consideration of having advanced the starting year of phase 3 now to 2022 for some of the vessels concerned. We are looking forward for this yet being adressed accordingly in future sessions by the relevant bodies. Thank you very much, and appreciate this statement to be included in the final report."

ITEM 6.

Statement by the observer of IACS

"Thank you, Chair.

The Committee will recall that at its last session it approved MEPC.1/Circ.876. Paragraph 5.1 of this circular states:

"Member Governments are invited to encourage stakeholders concerned to submit SEEMP part II to the Administration or its recognized organization by 1 September 2018".

The Committee will recall that a catalyst for the development of this circular was the information IACS provided to MEPC 72 regarding the number of SEEMP part II documents IACS Members had received for review. At that time, IACS members, in their capacities as recognized organizations, had received less than 100 SEEMP part II documents for approval in accordance with regulation 22.2 of MARPOL Annex VI. This was in the context of about 31,000 ships that IACS members were expecting to receive by 31 December 2018.

The Committee is invited to note that compared to the 0.3 per cent submission level that was reported to MEPC 72; the current level of submissions is running at approximately 33 per cent. While this represents a significant improvement on the level reported to MEPC 72, IACS Members estimate that as many as 19,000 documents still need to be submitted. Therefore, IACS would urge the Committee to reiterate its encouragement for the stakeholders concerned to submit their SEEMP part II documents as soon as possible. A confirmation of compliance will be required on all ships to which the data collection system applies in only [71 – based on the Tuesday of MEPC 73] days from now.

Thank you."

ITEM 7.

Statement by the UNFCCC Secretariat

"Thank you, Mr. Chairman. I would like to take this opportunity to inform the Committee on behalf of the UNFCCC secretariat on: (i) the key outcomes of climate change conferences in Bonn and Bangkok, which took place in May and September 2018 and objectives for next conference of Parties (COP 24) in Katowice in December this year; (ii) its relevance to the work of IMO on addressing greenhouse gas emissions from international shipping; and (iii) our expectations for this MEPC session.

Distinguished delegates, let me start by emphasizing the importance of fully operationalizing the Paris Agreement by the end of this year, which is essential for determining whether total world emissions are declining fast enough to achieve agreed temperature goals.

As some of you may have listened to the presentation at the ISWG-GHG4, recently published IPCC's Special Report on the impacts of global warming of 1.5°C above pre-industrial levels emphasizes that pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, transport, land, and industrial systems, including the use of carbon dioxide removal. It also stressed that pathways reflecting current nationally determined contributions (NDCs) under the Paris Agreement would not limit global warming to 1.5°C, even if supplemented by very challenging increases in the scale and ambition of emissions reductions after 2030.

This makes urgent for Parties to reach agreements on many politically sensitive and technically complex implementation and operational issues of the Paris Agreement, covering mitigation, adaptation, means of implementation, enhanced transparency framework as well as increasing ambition beyond current pledges.

Key outcomes of Bonn and Bangkok climate change conferences and priorities for COP 24

Parties gathered in Bonn and Bangkok earlier this year for the meetings of the subsidiary bodies with clear understanding that the timing is critical now and that negotiations should advance more rapidly and effectively through a list of elements of the future implementation guidelines under the Paris Agreement Work Programme.

The main goal of these sessions was to progress and bring the informal draft documents by the Chairs and informal notes by the facilitators on all issues to a level of maturity necessary for a negotiating text, so as to enable effective negotiations in COP24 in Katowice and their successful conclusions.

Overall, a good progress was achieved on all items that comprise the implementation guidelines of the Paris Agreement. This was captured in texts that will serve as the foundation for the final round of negotiations in Katowice. Also, the Chairs of the negotiations bodies were mandated to prepare for the COP in Katowice joint reflections note addressing progress made to date and identifying ways forward, including textual proposals that would be helpful for advancing Parties' deliberations. In addition, the Parties are aware that the progress was not even so far across the elements of the implementation guidelines. It is important to say that these elements all need to function together in an inter-connected and transparent manner and for this reason it is critical to achieve balanced progress on all elements in preparation for COP24 in Katowice.

In parallel to the formal negotiations, the conference in Bonn hosted the Talanoa Dialogue to inspire higher ambition on climate action. The dialogue is focused on three questions related to the progress towards the long-term goals of the Paris Agreement: "*Where are we?*", "*Where do we want to go?*" and "*How do we get there?*"

The dialogue witnessed some 250 participants share their stories, providing fresh ideas and renewed determination to raise ambition. The dialogue wrote history when countries and non-Party stakeholders including cities, businesses, investors and regions engaged in interactive story-telling for the first time.

Regarding emissions from international transport, we are witnessing one important development under Subsidiary Body for Scientific and Technological Advice (SBSTA). For the first time and after a series of meetings held during May conference in Bonn on this agenda item, Parties couldn't agree on procedural conclusion proposed by the SBSTA Chair.

It is evident that both, the procedural and substantive aspects of reporting by IMO and ICAO on their actions to address greenhouse gas emissions were deemed equally important for many Parties to the UNFCCC and they wish to engage in more in-depth discussion on this item.

One of the possible ways forward that is under consideration by the SBSTA Chair is to provide space and time for all interested Parties to consult on this item.

We strongly believe that further showcasing of the progress in IMO's submission to SBSTA, highlighting the results made by IMO on mitigation actions and supporting developing countries

in building their capacities to implement those actions will continue to be of high relevance for Parties at the next 49th SBSTA session in Poland.

Distinguish delegates, allow me to briefly inform you on the main objectives for COP 24, which is only six weeks ahead of us. It is clear, that the focus of negotiations will be on finalizing the implementation guidelines of the Paris Agreement.

The guidelines are needed to enable everyone to see how the agreement is being implemented by each individual country. This is equally important for having clarity on whether the world as a whole is on track to achieve the goals of the Paris Agreement. There are also other very important objectives: (i) there will be a number of critically important high-level events, including on climate finance – a topic that is of key importance to developing countries; (ii) we will also see the political phase of the Talanoa Dialogue, which has sparked a series of constructive, solutions-oriented conversations around the globe in 2018; (iii) there will also be a stock-take of climate actions before 2020; (iv) Global Climate Action will also host a high-level event, aiming to strengthen the cooperation between governments, cities, regions, businesses and investors.

What this means for the work of the IMO

How these developments under the Convention and the Paris Agreement relate to the ongoing work by the IMO on addressing greenhouse gas emissions from international shipping?

We are aware that current nationally determined contributions cover only one third of the emission reductions needed by 2030 to remain on the least-cost pathway to staying well below 2 °C. Staying on that pathway is only possible if the next round of NDCs shows more ambition in all sectors, including international shipping.

Looking ahead, the Talanoa Dialogue launched at COP 23 and started in January this year provides a great opportunity for IMO to increase the global visibility of this broad portfolio of emission reduction measures including the initial strategy, and to put these efforts in the global context.

We acknowledge with appreciation that IMO has submitted the note on the adoption of its initial strategy on reduction of GHG emissions from ships and ongoing activities related to reduction of GHG emissions to the preparatory phase of Talanoa Dialogue process in May this year.

As you may know, Talanoa Dialogue aims to take stock of the progress of collective global efforts towards the long-term mitigation goal of the Paris Agreement and inform preparation of Parties' NDCs, and in case of the IMO, possibly on its revised strategy. Summary note of the Talanoa Dialogue in May 2018 highlighted the importance of climate actions by Parties and other stakeholders, such as international organizations, including the IMO.

Furthermore, political phase of the Talanoa Dialogue process will start in COP 24 in December 2018. This will be again an important opportunity for IMO to inform the world and promote its work.

We welcome additional inputs from IMO particularly on the programme of follow-up actions for the initial strategy, to the political phase that will have Ministerial Round Tables to discuss how to collectively achieve the long-term mitigation goals of the Paris Agreement.

Expectations from the MEPC 73

We strongly believe that the 73rd MEPC session will continue to shape the future response and contribution of the international maritime transport sector to climate change.

On behalf of the UNFCCC secretariat, I would like to encourage the MEPC to aim to achieve tangible progress at this session, in particular by adopting a programme of the follow-up actions of the initial IMO strategy on the reduction of greenhouse gas emissions from ships.

As stated by the IPCC's 1.5°C Special Report and by the vision of the IMO initial strategy, urgency of climate actions should be fully taken into account in the programme of the follow-up actions, including early actions of short-term measures and initiation of the work of mid-and long-term measures prior to 2023, and effective and practical working arrangements to support them.

Further, the initial strategy aims at enhancing IMO's contribution to the global efforts in addressing GHG emissions. Hence, it is important that the process to develop the revised strategy consider the latest levels of global ambitions required for achieving the long-term temperature goal of the Paris Agreement. The outcome of the Talanoa Dialogue this year, recently published IPCC's 1.5°C Special Report, and IPCC's 6th Assessment Reports to be published in 2021 and 2022, will inform IMO on this matter.

As always, we are looking forward to further strengthening the excellent cooperation between our secretariats on climate-related matters.

Thank you for your attention."

Statement by the delegation of the Cook Islands

"Kia Orana,

The Cook Islands stresses that the impact assessments of candidate or new measures must be done prior to the consideration, development and imposition of any such measures and must reflect the particular and unique challenges we face within our vast and remote Pacific region where context and understanding of the local situation is extremely important.

Chair, we already recognise that all sectors and all member states must play their part in reducing CO₂ emissions but what we are focussed on here is specifically the impacts on SIDS like ours of measures taken in this house to address problems that we did not create, and have limited ability to influence. To put into context the Cook Islands contributes only .00012% of Global CO₂ emissions of which 1% is from domestic shipping.

Chair, to reiterate, we consider that assessment of the impacts on our economy arising from any candidate or new proposals must be followed by concrete action recognising our special shipping needs. Whether this is by the way of some sort of compensatory mechanism or another offset response remains to be discussed, but to be very clear, this response must be incorporated into any candidate or new measure.

Chair, this must be a prerequisite, if not a co requisite, for the adoption of any further GHG reduction measures by this organisation."

Statement by the delegation of the Solomon Islands

"Mr Chairman, Honourable Ministers, Excellencies, fellow IMO members, good morning. Last week the Solomon Islands delegation gave a lunchtime presentation to the Intersessional Working Group on the IPCC special report on Climate Change of 1.5. The report is very clear. We must rapidly decarbonise all sectors within the next ten years if we are to limit global average temperature increase to 1.5 degrees.

This means that we need to progress implementation of the IMO's Initial Strategy that this Committee adopted in April as a matter of urgency. In particular we must adopt and implement measures that achieve sizeable reductions in emissions reduction prior to 2023.

It is also essential that the most vulnerable to the effects of climate change, SIDS and LDCs, are able to effectively participate in the processes and procedures this Committee adopts, to propose, consider, assess, adopt and implement measures to reduce GHG emissions.

The reality is that our capacity is already severely limited, and there is a huge additional workload ahead of us. There is a real danger, that without sufficient funding to resource capacity building and technical cooperation, those most vulnerable to climate change will be disadvantaged in participating in the IMO processes to implement the follow up actions and the Initial Strategy.

We will not be in a position to submit proposals for emissions reduction measures and undertake impact assessments. We will not be able to undertake the research needed to establish baselines to ensure potential impacts can be properly identified. Our ability to actively participate in working and technical groups and meetings in London is limited.

Yet we cannot afford not to meaningfully engage. Our leaders have consistently stated that climate change is the single largest threat to our survival and for us all to do all we can to achieve the decarbonisation pathway in line with 1.5.

We applaud the Intersessional Working Group for progressing the follow up actions so that the work on measures can advance. We were particularly reassured by interventions made to last week's intersessional by the industry, who were clear that they are also looking for adoption and implementation of effective measures as quickly as possible.

I request the Secretariat to include my statement in the report from this Committee. Thank you."

Statement by the delegation of United Arab Emirates

"I would like to thank all submitters for their documents.

We do believe that ports could also contribute to the reduction of GHG emissions from ships as highlighted in documents MEPC 73-7-1 and MEPC 73-7-5. (MEPC 73-WP.5)

As it is suggested that the Committee adopt a resolution to encourage port developments and activities to facilitate the reduction of GHG emissions from ships but as most IMO instruments deal with ships, legal advice would be most appropriate in that matter;
The issue of reducing greenhouse gas emissions from ports falls under the national climate change plan. We would therefore encourage Member States to make proposals for the exchange of best practices as well as the development of non-mandatory guidelines to assist States in their capacity to reduce emissions from ports. "

أود أن أشكر جميع من قدم الوثائق وكذلك نشكر لجنة خفض انبعاثات الغازات الدفيئة من السفن على التقدم الايجابي الذي تم احرازه بهذا الشأن.

MEPC 73- سيدي الرئيس نعتقد أن الموانئ يمكن أن تسهم أيضا في خفض انبعاثات غازات الدفيئة من السفن على النحو المبين في الوثائق
MEPC 73-7-5. (MEPC 73-WP.5) و 7-1

نحن نود تأييد هذا المقترح ولكن وفد الإمارات يعلم تماما بأن معظم صكوك المنظمة البحرية الدولية تتعامل مع السفن ، لذا فإنه من الأنسب أخذ
المشورة القانونية حول اصدار قرار من لجنة حماية البيئة البحرية.

إن موضوع خفض انبعاثات الغازات الدفيئة من الموانئ يندرج تحت الخطة الوطنية للتغير المناخي، لذا فإننا نود نشجع الدول الأعضاء على تقديم
" مقترحات لتبادل أفضل الممارسات وكذلك وضع خطوط ارشادية غير الزامية لمساعدة الدول حسب امكانياتها لخفض الانبعاثات من الموانئ.

ITEM 8.

Statement by the delegation of Finland

"Thank you Mr.Chair,

First of all we would like to thank the chair Ms Annalisse Sly for successfully chairing the working group on marine litter. Without her guidance, we would have not been able to reach such a comprehensive outcome. Our thanks also go to the secretariat for its assistance.

The Action Plan to Address Marine Plastic Litter from Ships includes many important elements and we look forward to working towards for their development at sub-committee level (PRF, III, CCC).

However, we would like to raise an issue, which was discussed in the working group, namely the **obligation to deliver garbage to port reception facilities**. The delivery obligation is an element which was suggested in the Document MEPC 73/8/3 submitted by Austria et.al, to be included in the Action Plan. We regret that the working group was not able to accept this as a measure to be listed in the Action plan.

We feel a piece is missing in the MARPOL regime. We have the stringent discharge regulations – the total ban to discharge plastics into the sea - and we have the requirement for the Member States to provide adequate port reception facilities. However, there is no obligation for a ship to actually deliver plastics/garbage to PRF.

Ensuring the delivery of garbage is important also from the port's perspective since the ports need assurance that the waste reception services they provide, are also used by the port callers.

We would like to emphasize that a proper balance should be achieved between the efforts from ports and ship operators, as both the land and seaside carry the responsibility for reducing marine plastic litter from ships.

Thank you and Mr. Chair, and sorry for this lengthy statement which we would like to have included in the report of the Committee."

ИТЕМ 9.

Statement by the delegation of Russia

"Хотели бы обратить внимание на текст п. 9.9 документа WP.1, который составлен по итогам второго суммирования председателя по пункту 9, и это второе суммирование внесло некоторую путаницу по сравнению с первым суммированием.

Как мы поняли это суммирование и как мы видим текст пункта 9.9, заинтересованные стороны должны представить к PPR 6 как предложения по методологии оценки воздействия, так и результаты проведенных оценок с учетом, что, как мы понимаем, результат оценки последствий будет рассматриваться на 6й сессии PPR.

Хотели бы обратить внимание на два момента.

Первое – КЗМС 73 не одобрил какую-либо единую методологию проведения исследования, а поручает PPR 6 (в п.9.8 WP.1) завершить работу над методологией, используя несколько представленных государствами и неправительственными организациями документов по этому вопросу, содержащих описание различных подходов. Таким образом, единой методологии на данный момент нет, а значит не приходится говорить о едином подходе к анализу полученных результатов, и при этом мы поручаем тому же PPR 6 проанализировать уже и результаты оценки.

Второе, на что хотелось бы обратить внимание - на всю эту работу по подготовке исследования оценки последствий Комитет отводит заинтересованным государствам по сути три с половиной недели, учитывая крайний срок представления документов на PPR 6.

Это при том, что единая методология отсутствует, а также, как правильно говорили выступавшие делегации, часть данных для проведения оценки последствий имеется в наличии, однако часть данных отсутствует. Эти необходимые данные нужно будет получать, анализировать, систематизировать, проводить на их основе исследование и представлять его в ИМО в беспрецедентно короткий срок.

В этой связи мы выражаем серьезные сомнения, что за такой короткий срок будет возможно представить серьезные, обоснованные и всесторонние исследования, отвечающие поставленным задачам, а, соответственно, существует большая вероятность, что рассмотрение вопроса "разработки запрета на использование тяжелого топлива в Арктике на основе оценки последствий", как указано в задании для PPR 6, может быть проведено без должной проработки этих самых последствий.

Мы в очередной раз сталкиваемся с ситуацией, когда есть все основания считать, что решение будет приниматься спешно, без должного научного и социально-экономического обоснования, рассмотрения оценки воздействия на государства и без учета даже того факта, что для принятия решения может быть недостаточно данных.

Сколько раз мы за последнее время принимали такие решения, которые потом сложно или невозможно выполнять. Стоит упомянуть, что мы столкнулись с аналогичной ситуацией по другому вопросу, в том числе и на этой сессии.

Мы полагаем неприемлемым такой подход к регулированию международного судоходства и призываем вернуться на путь разработки требований на основе должной технической проработки и на основе достоверных научных данных."

"We would like to draw the attention to the text in item 9.9 of the document WP.1, which was compiled as a result of the second summation by the Chair on item 9 which made certain confusion comparing to the first summation.

As we understood the summation and as we see in item 9.9 of the report, the interested parties are invited to submit to PPR 6 proposals for impact assessment methodology as well as the results of impact assessments, with the understanding that PPR 6 will consider the results of the assessments.

We would like to draw the attention to the following two aspects:

First – the MEPC 73 did not agree on any single methodology for an assessment, but instructs the PPR 6 (see item 9.8) to complete the work on methodology, using several submissions that contain description of different approaches. Thus, there is no single methodology at the moment which means that there is no common approach to assess the results, but we instruct PPR 6 already to analyze the results of assessment.

Second issue – the Committee gives to the interested parties only in fact three and a half weeks for all of the work to prepare the impact assessment results, taking into account the deadlines for PPR 6.

Besides that the single methodology is not at hand and, as correctly pointed out by several delegations, some data already exist but some does not, and there is a need to get the data, analyze, systematize, develop a study and submit a paper to the IMO within the shortest period of time which does not seem to have precedents.

In this respect we would like to express serious doubts that within such a short period of time there would be a possibility to present serious, justified and comprehensive studies which correspond to the task and, consequently, there is a serious possibility that the consideration of the matter of "development of a ban on HFO for use and carriage as fuel by ships in Arctic waters", as mentioned in the task to PPR 6, may be conducted without due elaboration of the consequences.

We see this as another case when there are grounds to consider that the decision would be taken in a rush, without due scientific and socio-economic justification, proper consideration of impact assessment on states and without even consideration of the fact that the appropriate data may not be available for taking the decision.

Recently we have taken a number of decisions which appear to be difficult to implement. It is worth mentioning that even at the present session we've faced similar situation.

The Russian Federation considers that it is not a proper way to regulate the international shipping and we urge to get back to development of requirements on the basis of due and appropriate technical justification and reliable scientific data."

ITEM 11.

Statement by the delegation of United States

"Thank you Mr. Chair,

We thank the Secretariat, PPR, and the Chair of the correspondence group for their work on the draft guidelines and proposed amendments for the use of electronic record books.

The United States is not opposed to the eventual use of electronic record books to satisfy the requirements of MARPOL, but at this point, we strongly oppose the approval in principle of *the Guidelines for the use of electronic record books under MARPOL* and we will similarly oppose the proposed amendments concerning electronic record books when they come up for consideration.

As drafted, the amendments would allow the use of ERBs if approved by an Administration "taking into account" non-mandatory Guidelines. It is the long-held view of the United States that in order for electronic record books to provide the same degree of accessibility, consistency, clarity, reliability, integrity and accountability as hard copy records presently required by MARPOL, their use should only be permitted after mandatory requirements for electronic record books are adopted and incorporated into the text of MARPOL. Not doing so, will reduce the level of environmental protection currently provided by MARPOL and undermine the uniformity that currently allows the maritime industry, flag Administrations, and port state authorities to rely on logbooks without delay or confusion. This would be detrimental to the industry as a whole and inconsistent with the IMO's mission. Accordingly, the United States believes that mandatory standards and requirements, in the form of a technical code, are necessary in order to implement the use of electronic record books pursuant to MARPOL.

The pending proposal occurs in a context where deliberate and intentional violations of MARPOL remain all too frequent. The United States has prosecuted more than 200 such cases involving all types of commercial vessels and numerous flag Administrations. To be clear, we are not speaking about negligent spills, casualties or accidents. Our cases involve *deliberate* discharges and the *intentional falsification* of official MARPOL records, including Oil Record Books, and Garbage Record Books.

The record book is a powerful MARPOL compliance and enforcement tool; in fact, it is the single most important way for ships to demonstrate compliance with MARPOL to both flag and port states. For an electronic record book to continue filling this critical role, all parties – owners, operators and flag and port state authorities – must have absolute confidence that the information is accurate and verifiable. This can only happen if electronic record books are required to meet a mandatory code of specified technical standards. Clear, defensible, mandatory standards create an environment in which hardware and software developers can design, and Administrations can approve electronic record books that facilitate effective enforcement of MARPOL, thus preserving the level playing field that currently exists with paper record books.

In addition to our objection to non-mandatory guidelines, we also have identified a number of substantive problems with the draft guidelines, many of which we presented in the U.S. paper submitted to PPR-5.

We are particularly concerned by apparent conflicts between the draft guidelines and the requirements of MARPOL, which we believe would need to be addressed even if this Committee decides to proceed with the draft guidelines and the proposed amendments.

As drafted, the proposed Guidelines might be argued to create "pending" entries -- a new type of entry not presently contemplated nor authorized by MARPOL. There are no stages of entries such as "pending", "awaiting status" and "re-verification" set forth in MARPOL, and the failure to sign entries in an electronic record book when a signature is required would violate MARPOL's recording requirements.

MARPOL requires that the record be available for inspection at all reasonable times. The proposed guidelines lack sufficient detail to ensure that the electronic records will be sufficiently accessible to satisfy MARPOL's requirements.

The draft guidelines also provide for automated entries. MARPOL requires that people, not machines, make the required entries and record operations and events as they actually occurred. A system that involves auto correction of entries or suggests what entries should be made is inconsistent with MARPOL.

Additionally, our cyber security experts have identified a number of serious problems in the draft guidelines that must be addressed, including:

- The lack of specific adequate requirements for secure and tamper proof technology, including biometric identity-proofing, necessary to authenticate all persons making or modifying entries to prevent log-in identifiers being borrowed or stolen;
- The lack of a requirement for an electronic log to cryptographically bind the content of the event being recorded with the person making the entry in order to preclude it from being revised without a trace; and
- The absence of clarity regarding what metadata must be recorded, preserved and available for inspection to show any changes to an entry.

Other technical issues that remain unaddressed or inadequately addressed in the draft guidelines, include:

- The lack of a requirement that the entire electronic book, including all metadata, and linked files/records can be printed out in its entirety on board;
- The need to address known contingencies such as computer viruses, corruption of data, computer crashes, and loss of power; and
- The lack of a requirement for the capability to preserve recorded data regardless of hardware or software updates.

These deficiencies underscore the larger problem of leaving the development of electronic record books to the discretion of individual Administrations through a set of non-mandatory guidelines. The resulting lack of uniformity will be harmful to industry, Administrations and port state control.

For these reasons, the United States respectfully recommends that this body not give its approval in principle to the draft *Guidelines for the use of electronic record books under MARPOL*, and instead agree that there is a need for mandatory requirements for electronic record books. We understand that this will cause some delay, but in our view, it is not an undue delay. The resulting improvements will benefit everyone, from the developers who create and market the hardware and software to the users aboard a ship to the inspection personnel at the port. This delay need not be extensive; the expertise and experience to develop reasoned

and robust standards is readily available. Furthermore, there is no compelling need to permit the use of electronic record books without mandatory standards. It is more important that we amend MARPOL and implement electronic record books properly and uniformly in order to provide the same level of environmental protection and confidence currently provided by hard copy record books.

We will provide a copy of this statement to the Secretariat and request it be attached to the report of the Committee.

Thank you, Mr. Chair."

Statement by the delegation of United States

"Thank you Mr. Chair.

With regard to the decisions by this Committee to approve amendments to MARPOL Annexes I, II, V and VI to allow the use of electronic record books and to approve in principle to inadequate non-mandatory guidelines for electronic record books, the United States reserves its position. As explained in our previous interventions, these decisions do not give assurance that electronic record books will provide the same level of safety, security, protection, reliability or availability as required for the hard copy record book and will present unknown risks and vulnerabilities that will reduce the level of environmental protection from that presently provided by MARPOL. This will be detrimental to the industry and is not in keeping with IMO's mission. We request this be noted in the final report of the Committee.

Thank you Mr. Chair."
