



SPECIAL CIRCULAR

No. 13-009
3 September 2012

To the Members

Dear Sirs,

Discharge of Cargo Residues into the Sea under Marpol Annex V

Members' attention is drawn to recent revisions to Marpol Annex V which came into force on 1st January 2013.

The revised Annex V prohibits the discharge of all garbage into the sea, except as provided otherwise. The revisions have created uncertainty. This Club Circular draws Members' attention to the prohibitions contained in the legislation and outlines how Members may ensure compliance.

1. MARPOL – the regulatory instrument

- 1.1 The overriding objective of the International Convention for the Prevention of Pollution from Ships 1973 as amended by the 1978 Protocol ("Marpol 73/78") is to minimize pollution of the seas including dumping, oil and exhaust pollution.
- 1.2 Revised Annex V (**attachment 1**) is binding on ratifying states. It may be downloaded from: [http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201\(62\).pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201(62).pdf)
- 1.3 Revised Annex V incorporates:
 - 1.3.1 General guidelines for implementation ("the Guidelines", **attachment 2**). The Guidelines may be downloaded from: [http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219\(63\).pdf](http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219(63).pdf)
 - 1.3.2 Guidelines for the development of garbage management plans ("Guidelines for garbage management plans", **attachment 3**). These may be downloaded from: [http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/220\(63\).pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/220(63).pdf)
- 1.4 This circular contains sufficient information for Members to obtain an overview of Revised Annex V but Members are recommended to review the attachments for the detail.

2. General outline of MARPOL Annex V

- 2.1 The starting-point is that all discharge is prohibited. In particular, plastics and cooking oil must not be discharged into the sea (**attachment 1**, Regulation 3).

Types of garbage	Ships outside special areas	Ships within special areas	Offshore platforms and all ships within 500m of such platforms
All garbage and in particular plastics (incl. but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products – Reg 3.2) and cooking oil (Reg 3.3)	Discharge prohibited	Discharge prohibited	Discharge prohibited

2.2 **Specific exceptions** are made for particular types of garbage which are considered less harmful. Whether the different exceptions are applicable is dependent on the geographical area. Some areas are considered to have more sensitive ecosystems than others. Members should refer to **attachment 1** for the detailed geographical definition (longitude/latitude) of the special areas.

Outside Special Area for purposes of Annex V	Within Special Area for purposes of Annex V
The rest of the world	<p>Mediterranean Sea area (as defined in Reg 1 para 14.1)</p> <p>Baltic Sea area (as defined in Reg 1 para 14.2)</p> <p>Black Sea area (as defined in Reg 1 para 14.3)</p> <p>Red Sea Area (as defined in Reg 1 para 14.4)</p> <p>Gulfs area (as defined in Reg 1 para 14.5)</p> <p>North Sea area (as defined in Reg 1 para 14.6)</p> <p>Wider Caribbean Region (incl. the Gulf of Mexico and the Caribbean Sea as defined in Reg 1 para 14.8)</p> <p>Antarctic area (south of latitude 60° south, as defined in Reg 1 para 14.7) which is subject to additional regulations*.</p>

* Additional requirements in relation to the Antarctic area: adequate reception facilities must be provided for vessels arriving in, transiting or departing from the area. Flag states must ensure that ships, before they enter the area, have sufficient capacity for retention of all garbage (Reg 6 para 3, attachment 1).

2.3 Garbage which may be discharged, subject to geographical area:

Types of garbage	Regulation 4: Ships outside special areas (See section 2.2 above for special areas)	Regulation 6: Ships within special areas to observe special rules in relation to each type of garbage and special rules in relation to the Antarctic area (See section 2.2 above for special areas)	Offshore platforms and all ships within 500m of such platforms in Regulation 5
Food waste capable of passing through a screen with opening no greater than 25mm and which has been passed through a comminuter or grinder	<p>Discharge permitted when <i>en route</i> and 3nm from the nearest land</p> <p>Reg 4 para 1.1</p>	<p>Discharge permitted when <i>en route</i> and 12nm from the nearest land</p> <p>In Antarctic area discharge of avian products (incl. poultry) is not permitted unless treated to be sterile.</p> <p>Reg 6 para 1.1</p>	<p>Discharge permitted When platform (or ship within 500m reach) located 12nm from the nearest land</p> <p>Reg 5, para 2</p>

Food waste not comminuted or ground	Discharge permitted when <i>en route</i> and 12nm from the nearest land Reg 4 para 1.2	Discharge prohibited Reg 6 para 1.1	Discharge prohibited Reg 5, para 1
Cargo residues which cannot be recovered using commonly available methods for unloading and which are not harmful to the marine environment See section 3 below for meaning of ‘cargo residues’	Discharge permitted when <i>en route</i> and 12nm from the nearest land Reg 4 para 1.3 See paragraph 3 below regarding the difficulty of classifying cargoes as hazardous or non-hazardous	Discharge only of cargo hold washing water (which may contain cargo residues) permitted, but only in specified circumstances** Reg 6 para 1.2 See paragraph 3 below regarding the difficulty of classifying cargoes as hazardous or non-hazardous	Discharge prohibited Reg 5, para 1
Cleaning agents and additives contained in cargo hold, deck and external surfaces wash water which are not harmful to the marine environment	Discharge permitted Reg 4 para 2	Discharge permitted Reg 6 para 2	Discharge prohibited Reg 5, para 1
Animal carcasses of animals carried as cargo and which died during the voyage	Discharge permitted as far from nearest land as possible Reg 4 para 1.4	Discharge prohibited	Discharge prohibited Reg 5, para 1
Mixed garbage of different substances	Of the different substances the more stringent requirements apply Reg 4 para 3	Of the different substances the more stringent requirements apply Reg 6 para 4	

** Specified circumstances for discharge of cargo hold washing water in special areas:

If all of the conditions below are satisfied, the discharge of washing water must be made not less than 12nm away from land/ice shelf:

- Cargo residues, cleaning agents or additives contained in hold washing water must not include any substances harmful to marine environment; **and**
- Voyage from port of departure to destination must not involve transit outside special area; **and**
- No adequate reception facilities in the ports of call.

2.4 **General exceptions** are at Regulation 7 of Marpol Revised Annex V (**attachment 1**). They apply irrespective of the vessel's geographical location. The general exceptions are aimed at cases of emergency and allow relief in cases of:

- Discharge necessary for the purposes of securing safety of a ship or for saving life at sea;
- Accidental loss of garbage resulting from damage to a ship if all reasonable precautions have been taken;
- Accidental loss of fishing gear from a ship if all reasonable precautions have been taken; or
- Discharge of fishing gear from a ship for the protection of the marine environment or for safety of that ship or its crew.

3 Discharging cargo residues: how to comply with Revised Annex V

3.1 Cargo residues: in general

“Cargo residues means the remnants of any cargo which are not covered by other Annexes to the present Convention and which remain on the deck or in holds following loading or unloading, including loading and unloading excess or spillage, whether in wet or dry condition or entrained in wash water but does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship.” (Regulation 1, Definitions, sub-paragraph 2, **attachment 1**).

Accordingly, mere cargo dust is not within the definition, but everything else cargo-related is.

3.2 Cargo residues outside special areas: limitations on discharge

3.2.1 Discharge is to be limited to:

“...cargo residues that cannot be recovered using commonly available methods for unloading.” (Regulation 4, para. 1.3, **attachment 1**).

3.2.2 The Guidelines (**attachment 2**) provide that ports, terminals and ship operators should comply with best cargo-handling practices in the IMSBC Code in order to reduce the cargo actually remaining on board (paragraph 3.5).

3.2.3 The obligations of the IMSBC Code must be satisfied for the cargo residues to qualify as exceptions for the purposes of Regulations 4 and 6.

3.2.4 Further, the residues must not be harmful to the marine environment (Regulation 4, para. 1.3). Paragraph 3.2 of the Guidelines provides that residues are considered harmful if they are residues of solid bulk substances which are classified according to the criteria of the UN Globally Harmonised System 2011 ("UN GHS"). According to the UN GHS, a cargo is considered harmful ("HME") if it fails any of the following 7 criteria:

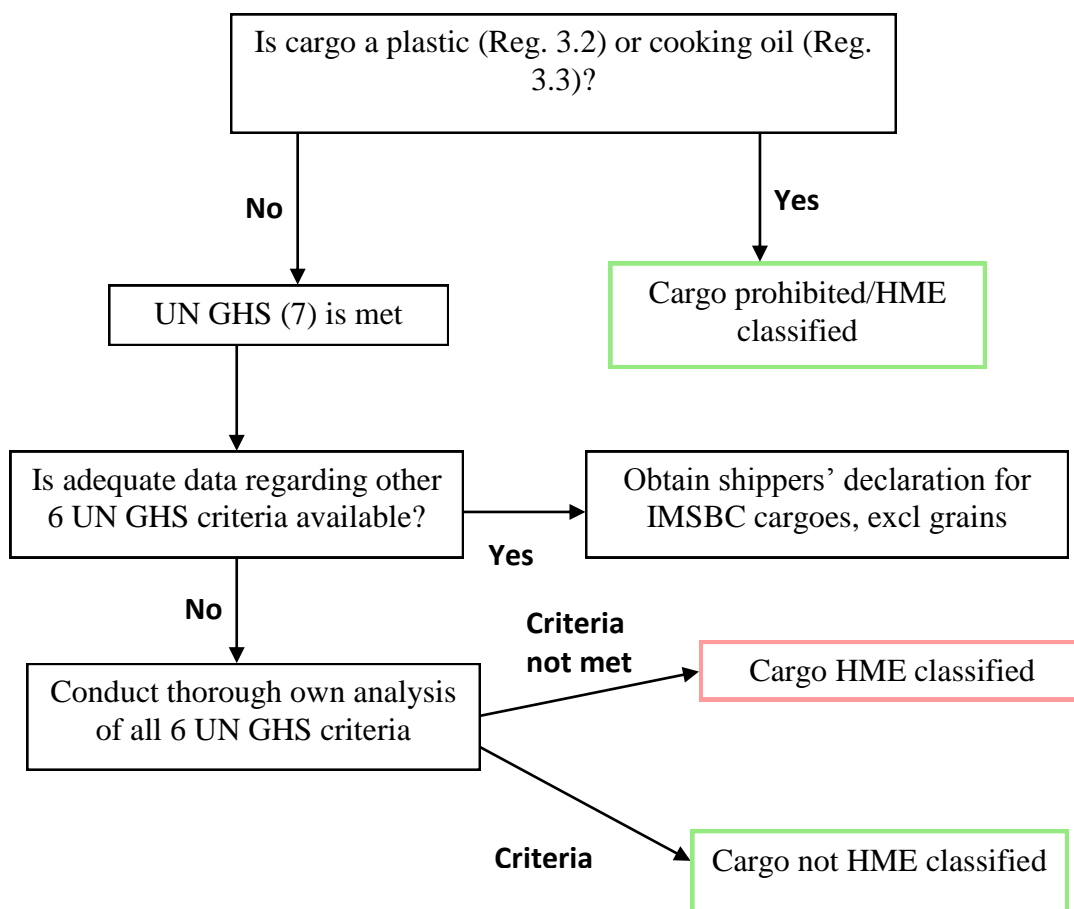
- (1) Acute Aquatic Toxicity Category 1;
- (2) Chronic Aquatic Toxicity Category 1 or 2;
- (3) Carcinogenicity Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation;
- (4) Mutagenicity Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation;
- (5) Reproductive Toxicity Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation;

- (6) Specific Target Organ Toxicity Repeated Exposure Category 1 combined with not being rapidly degradable and having high bioaccumulation; and/or
- (7) Solid bulk cargoes containing or consisting of synthetic polymers, rubber, plastics, or plastic feedstock pellets (this includes materials that are shredded, milled, chopped or macerated or similar materials).

Members may access more detail about these criteria at <http://www.unece.org/>.

According to section 4.2 of the IMSBC Code, detailed chemical characteristics of goods carried should be provided by the shippers of solid bulk cargoes (except for grain cargoes).

3.2.5 Considerations relevant to discharge of cargo residues



3.2.6 There was originally no list of solid bulk cargoes for the purpose of Annex V. This caused difficulty in classifying cargoes. The IMO recognized this in a circular, referred to hereafter as "the Amendment", **attachment 4**.

The Amendment may be downloaded from:

<http://www.safety4sea.com/images/media/pdf/IMO-MEPC-810.pdf>

3.2.7 The Amendment permits cargo hold washwater from holds previously containing hazardous solid bulk cargoes to be discharged into the sea outside special areas, provided that:

- Based upon the information received from the relevant port authorities, the master determines that there are no adequate reception facilities either at the receiving terminal or at the next port of call;
- The ship is en route and as far as practicable from the nearest land, but not less than 12nm;

- Before washing, solid bulk cargo residue is removed (and bagged for discharge ashore) as far as practicable and holds are swept;
- Filters are used in the bilge wells to collect any remaining solid particles and minimize solid residue discharge; and
- The discharge is recorded.

3.2.8 In theory, shippers have an obligation to provide adequate specifications of the cargo to be loaded under the IMSBC Code. In practice, it may be difficult to obtain this data in all circumstances. The Group of Experts on Scientific Aspects of Marine Pollution ("GESAMP") publishes a list of materials which may be considered as hazardous to the marine environment (**attachment 5**).

The list may be downloaded:

<http://www.imo.org/OurWork/Environment/PollutionPrevention/ChemicalPollution/Documents/GESAMP-EHSCompositelistofhazardprofiles.pdf>

3.2.9 Note, however, that GESAMP's guidance cannot be relied upon as conclusive. In the event that it is necessary to conduct an analysis (because insufficient scientific data is available about the cargo residue), Members will need to instruct laboratories which will comply with the UN GHS criteria.

3.3 Cargo residues inside special areas: limitations on discharge

Inside special areas, discharge is restricted to:

“Discharge of cargo residues that cannot be recovered using commonly available methods for unloading, where all of the following conditions are satisfied:

Cargo residues, cleaning agents or additives, contained in hold washing water do not include any substances classified as harmful to the marine environment, taking into account guidelines developed by the Organization;

...

Where the conditions of subparagraphs 2.1, 2.2 and 2.3 of this paragraph have been fulfilled, discharge of cargo hold washing water containing residues shall be made as far as practicable from the nearest land...” (Regulation 6 para 1.2).

Accordingly, only cargo hold washing water containing residues of cargo may be discharged into sea inside a special area.

Note that the Amendment (**attachment 4**) applies only to discharge of cargo residue outside special areas. Accordingly, if there is any doubt about the hazardous nature of the cargo, the cargo residues should not be discharged into the sea.

3.4 Case study: application of the rules to bark remnants of a cargo of logs remaining on deck after unloading of cargo

The bark would be a cargo residue for the purposes of the definition discussed in section 3.1 above.

Discharge into the sea not within a special area:

In accordance with the overriding objective of Revised Annex V the residues should be discharged in a port rather than at sea. Discharge into the sea should always be the last resort.

Consider whether the bark could have been recovered at discharge port using commonly available methods (attachment 1, Regulation 4 para. 1.3).

The IMSBC Code provides no special requirements for discharge. Accordingly, it should be possible to remove bark residue at any port when conducting a thorough discharge operation.

Determine whether the cargo is classified as harmful to the marine environment. At first glance, bark residue would not appear to be harmful to the environment. However, local and global phytosanitary regulations (e.g. ISPM No 15) may require wood cargoes to be fumigated prior to shipment. The toxic fumigant used is likely to remain highly concentrated in the barks and would render the residues potentially harmful.

If that were the case, the bark residue could not be discharged into the sea outside special areas (and therefore, obviously, not within special areas either).

This illustrates that each cargo residue has to be considered on its own facts. In this case, a fumigant may render a safe cargo potentially hazardous to the marine environment. In case of doubt, ships' crews should be instructed to liaise with the technical management ashore before discharge.

3.5 Action by Members

In order to ensure that officers and crew are fully aware of the obligations of Revised Annex V, we recommend that Members should prepare and issue a garbage management manual. We refer to the Guidelines for the development of garbage management plans ("Guidelines for garbage management plans", **attachment 3**). Adherence to such a garbage management plan will enable Members to demonstrate that due diligence has been exercised to comply with Revised Annex V. Training should also be given, and training records completed and kept. In cases of doubt, officers and crew should refer questions to shore management. Shore management may in turn need to refer to the competent authority in the jurisdiction of the port of call.

4. Penalties for violation of Marpol Annex V

Enforcement of the Regulation is contained in the Guidelines (**attachment 2**):

“Governments should identify appropriate agencies for enforcement and facilitating compliance and provide legal authority, adequate training, funding and equipment to incorporate the goals and objectives under Annex V regulations into their responsibilities...” (Paragraph 6.2.3).

Accordingly, enforcement is a matter for the law of individual ratifying member states. The competent authorities on a national level will be the government departments conducting port state control in the respective states. Those are the authorities which determine the penalties.

5. Club Cover for fines?

The relevant provisions are at Rule 31. Club cover may be prejudiced if the Member fails to take appropriate measures to prevent fines.

In conclusion, Members are advised to take all necessary precautions to ensure compliance with Revised Annex V, as outlined in section 3.5 above. Further, shipowners are advised to give consideration to taking legal advice on the drafting of express charterparty clauses which would oblige charterers to give employment orders which comply with Revised Annex V.

Yours faithfully,

The Japan Ship Owners' Mutual Protection & Indemnity Association

ANNEX 13**RESOLUTION MEPC.201(62)****Adopted on 15 July 2011****AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1978 RELATING TO
THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF
POLLUTION FROM SHIPS, 1973****(Revised MARPOL Annex V)**

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,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1973 Convention") and article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1978 Protocol") which together specify the amendment procedure of the 1978 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 Protocol (MARPOL 73/78),

HAVING CONSIDERED draft amendments to Annex V of MARPOL 73/78,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to Annex V of MARPOL 73/78, the text of which is set out at annex to the present resolution;
2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on 1 July 2012 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 per cent 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 the 1973 Convention, the said amendments shall enter into force on 1 January 2013 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to MARPOL 73/78 certified copies of the present resolution and the text of the amendments contained in the Annex;
5. REQUESTS FURTHER the Secretary-General to transmit to the Members of the Organization which are not Parties to MARPOL 73/78 copies of the present resolution and its Annex.

ANNEX

REVISED MARPOL ANNEX V

REGULATIONS FOR THE PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS

Regulation 1

Definitions

For the purposes of this Annex:

- 1 *Animal carcasses* means the bodies of any animals that are carried on board as cargo and that die or are euthanized during the voyage.
- 2 *Cargo residues* means the remnants of any cargo which are not covered by other Annexes to the present Convention and which remain on the deck or in holds following loading or unloading, including loading and unloading excess or spillage, whether in wet or dry condition or entrained in wash water but does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship.
- 3 *Cooking oil* means any type of edible oil or animal fat used or intended to be used for the preparation or cooking of food, but does not include the food itself that is prepared using these oils.
- 4 *Domestic wastes* means all types of wastes not covered by other Annexes that are generated in the accommodation spaces on board the ship. Domestic wastes does not include grey water.
- 5 *En route* means that the ship is underway at sea on a course or courses, including deviation from the shortest direct route, which as far as practicable for navigational purposes, will cause any discharge to be spread over as great an area of the sea as is reasonable and practicable.
- 6 *Fishing gear* means any physical device or part thereof or combination of items that may be placed on or in the water or on the sea-bed with the intended purpose of capturing, or controlling for subsequent capture or harvesting, marine or fresh water organisms.
- 7 *Fixed or floating platforms* means fixed or floating structures located at sea which are engaged in the exploration, exploitation or associated offshore processing of sea-bed mineral resources.
- 8 *Food wastes* means any spoiled or unspoiled food substances and includes fruits, vegetables, dairy products, poultry, meat products and food scraps generated aboard ship.
- 9 *Garbage* means all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish

including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing.

- 10 *Incinerator ashes* means ash and clinkers resulting from shipboard incinerators used for the incineration of garbage.
- 11 *Nearest land*. The term "from the nearest land" means from the baseline from which the territorial sea of the territory in question is established in accordance with international law, except that, for the purposes of the present Annex, "from the nearest land" off the north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in:
- latitude 11°00' S, longitude 142°08' E
to a point in latitude 10°35' S, longitude 141°55' E,
thence to a point latitude 10°00' S, longitude 142°00' E,
thence to a point latitude 09°10' S, longitude 143°52' E,
thence to a point latitude 09°00' S, longitude 144°30' E,
thence to a point latitude 10°41' S, longitude 145°00' E,
thence to a point latitude 13°00' S, longitude 145°00' E,
thence to a point latitude 15°00' S, longitude 146°00' E,
thence to a point latitude 17°30' S, longitude 147°00' E,
thence to a point latitude 21°00' S, longitude 152°55' E,
thence to a point latitude 24°30' S, longitude 154°00' E,
thence to a point on the coast of Australia in
latitude 24°42' S, longitude 153°15' E.
- 12 *Operational wastes* means all solid wastes (including slurries) not covered by other Annexes that are collected on board during normal maintenance or operations of a ship, or used for cargo stowage and handling. Operational wastes also includes cleaning agents and additives contained in cargo hold and external wash water. Operational wastes does not include grey water, bilge water, or other similar discharges essential to the operation of a ship, taking into account the guidelines developed by the Organization.
- 13 *Plastic* means a solid material which contains as an essential ingredient one or more high molecular mass polymers and which is formed (shaped) during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic. For the purposes of this annex, "all plastics" means all garbage that consists of or includes plastic in any form, including synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products.
- 14 *Special area* means a sea area where for recognized technical reasons in relation to its oceanographic and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by garbage is required.

For the purposes of this Annex the special areas are the Mediterranean Sea area, the Baltic Sea area, the Black Sea area, the Red Sea area, the Gulfs area, the North Sea area, the Antarctic area and the Wider Caribbean Region, which are defined as follows:

- .1 The Mediterranean Sea area means the Mediterranean Sea proper including the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41° N parallel and bounded to the west by the Straits of Gibraltar at the meridian 5°36' W.

- .2 The Baltic Sea area means the Baltic Sea proper with the Gulf of Bothnia and 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.
- .3 The Black Sea area means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41° N.
- .4 The Red Sea area means the Red Sea proper including the Gulfs of Suez and Aqaba bounded at the south by the rhumb line between Ras si Ane (12° 28.5' N, 43° 19.6' E) and Husn Murad (12° 40.4' N, 43° 30.2' E).
- .5 The Gulfs area means the sea area located north-west of the rhumb line between Ras al Hadd (22° 30' N, 59° 48' E) and Ras al Fasteh (25° 04' N, 61° 25' E).
- .6 The North Sea area means the North Sea proper including seas therein with the boundary between:
 - .1 the North Sea southwards of latitude 62° N and eastwards of longitude 4° W;
 - .2 the Skagerrak, the southern limit of which is determined east of the Skaw by latitude 57° 44.8' N; and
 - .3 the English Channel and its approaches eastwards of longitude 5° W and northwards of latitude 48° 30' N.
- .7 The Antarctic area means the sea area south of latitude 60° S.
- .8 The Wider Caribbean Region means the Gulf of Mexico and Caribbean Sea proper including the bays and seas therein and that portion of the Atlantic Ocean within the boundary constituted by the 30° N parallel from Florida eastward to 77°30' W meridian, thence a rhumb line to the intersection of 20° N parallel and 59° W meridian, thence a rhumb line to the intersection of 7°20' N parallel and 50° W meridian, thence a rhumb line drawn southwesterly to the eastern boundary of French Guiana.

Regulation 2

Application

Unless expressly provided otherwise, the provisions of this Annex shall apply to all ships.

Regulation 3

General prohibition on discharge of garbage into the sea

- 1 Discharge of all garbage into the sea is prohibited, except as provided otherwise in regulations 4, 5, 6 and 7 of this Annex.
- 2 Except as provided in regulation 7 of this Annex, discharge into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products is prohibited.
- 3 Except as provided in regulation 7 of this Annex, the discharge into the sea of cooking oil is prohibited.

Regulation 4

Discharge of garbage outside special areas

1 Subject to the provisions of regulations 5, 6, and 7 of this Annex, discharge of the following garbage into the sea outside special areas shall only be permitted while the ship is en route and as far as practicable from the nearest land, but in any case not less than:

- .1 3 nautical miles from the nearest land for food wastes which have been passed through a comminuter or grinder. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 mm.
- .2 12 nautical miles from the nearest land for food wastes that have not been treated in accordance with subparagraph .1 above.
- .3 12 nautical miles from the nearest land for cargo residues that cannot be recovered using commonly available methods for unloading. These cargo residues shall not contain any substances classified as harmful to the marine environment, taking into account guidelines developed by the Organization.
- .4 For animal carcasses, discharge shall occur as far from the nearest land as possible, taking into account the guidelines developed by the Organization.

2 Cleaning agents or additives contained in cargo hold, deck and external surfaces wash water may be discharged into the sea, but these substances must not be harmful to the marine environment, taking into account guidelines developed by the Organization.

3 When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply.

Regulation 5

Special requirements for discharge of garbage from fixed or floating platforms

1 Subject to the provisions of paragraph 2 of this regulation, the discharge into the sea of any garbage is prohibited from fixed or floating platforms and from all other ships when alongside or within 500 m of such platforms.

2 Food wastes may be discharged into the sea from fixed or floating platforms located more than 12 nautical miles from the nearest land and from all other ships when alongside or within 500 m of such platforms, but only when the wastes have been passed through a comminuter or grinder. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 mm.

Regulation 6

Discharge of garbage within special areas

1 Discharge of the following garbage into the sea within special areas shall only be permitted while the ship is en route and as follows:

- .1 Discharge into the sea of food wastes as far as practicable from the nearest land, but not less than 12 nautical miles from the nearest land or the nearest ice shelf. Food wastes shall be comminuted or ground and shall be capable

of passing through a screen with openings no greater than 25 mm. Food wastes shall not be contaminated by any other garbage type. Discharge of introduced avian products, including poultry and poultry parts, is not permitted in the Antarctic area unless it has been treated to be made sterile.

.2 Discharge of cargo residues that cannot be recovered using commonly available methods for unloading, where all the following conditions are satisfied:

.1 Cargo residues, cleaning agents or additives, contained in hold washing water do not include any substances classified as harmful to the marine environment, taking into account guidelines developed by the Organization;

.2 Both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between those ports;

.3 No adequate reception facilities are available at those ports taking into account guidelines developed by the Organization; and

.4 Where the conditions of subparagraphs 2.1, 2.2 and 2.3 of this paragraph have been fulfilled, discharge of cargo hold washing water containing residues shall be made as far as practicable from the nearest land or the nearest ice shelf and not less than 12 nautical miles from the nearest land or the nearest ice shelf.

2 Cleaning agents or additives contained in deck and external surfaces wash water may be discharged into the sea, but only if these substances are not harmful to the marine environment, taking into account guidelines developed by the Organization.

3 The following rules (in addition to the rules in paragraph 1 of this regulation) apply with respect to the Antarctic area:

.1 Each Party at whose ports ships depart en route to or arrive from the Antarctic area undertakes to ensure that as soon as practicable adequate facilities are provided for the reception of all garbage from all ships, without causing undue delay, and according to the needs of the ships using them.

.2 Each Party shall ensure that all ships entitled to fly its flag, before entering the Antarctic area, have sufficient capacity on board for the retention of all garbage, while operating in the area and have concluded arrangements to discharge such garbage at a reception facility after leaving the area.

4 When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply.

Regulation 7

Exceptions

- 1 Regulations 3, 4, 5 and 6 of this Annex shall not apply to:
 - .1 The discharge of garbage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
 - .2 The accidental loss of garbage resulting from damage to a ship or its equipment, provided that all reasonable precautions have been taken before and after the occurrence of the damage, to prevent or minimize the accidental loss; or
 - .3 The accidental loss of fishing gear from a ship provided that all reasonable precautions have been taken to prevent such loss; or
 - .4 The discharge of fishing gear from a ship for the protection of the marine environment or for the safety of that ship or its crew.
- 2 Exception of *en route*:
 - .1 The *en route* requirements of regulations 4 and 6 shall not apply to the discharge of food wastes where it is clear the retention on board of these food wastes presents an imminent health risk to the people on board.

Regulation 8

Reception facilities

- 1 Each Party undertakes to ensure the provision of adequate facilities at ports and terminals for the reception of garbage without causing undue delay to ships, and according to the needs of the ships using them.
- 2 Each Party shall notify the Organization for transmission to the Contracting Parties concerned of all cases where the facilities provided under this regulation are alleged to be inadequate.
- 3 Reception facilities within special areas
 - .1 Each Party, the coastline of which borders a special area, undertakes to ensure that as soon as possible, in all ports and terminals within the special area, adequate reception facilities are provided, taking into account the needs of ships operating in these areas.
 - .2 Each Party concerned shall notify the Organization of the measures taken pursuant to subparagraph 3.1 of this regulation. Upon receipt of sufficient notifications the Organization shall establish a date from which the requirements of regulation 6 of this Annex in respect of the area in question are to take effect. The Organization shall notify all Parties of the date so established no less than twelve months in advance of that date. Until the date so established, ships that are navigating in a special area shall comply with the requirements of regulation 4 of this Annex as regards discharges outside special areas.

Regulation 9

Port State control on operational requirements¹

1 A ship when in a port or an offshore terminal of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by garbage.

2 In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as will ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Annex.

3 Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.

4 Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

Regulation 10

Placards, garbage management plans² and garbage record-keeping

1 .1 Every ship of 12 m or more in length overall and fixed or floating platforms shall display placards which notify the crew and passengers of the discharge requirements of regulations 3, 4, 5 and 6 of this Annex, as applicable.

.2 The placards shall be written in the working language of the ship's crew and, for ships engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention, shall also be in English, French or Spanish.

2 Every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons, and fixed or floating platforms shall carry a garbage management plan which the crew shall follow. This plan shall provide written procedures for minimizing, collecting, storing, processing and disposing of garbage, including the use of the equipment on board. It shall also designate the person or persons in charge of carrying out the plan. Such a plan shall be based on the guidelines developed by the Organization² and written in the working language of the crew.

3 Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 or more persons engaged in voyages to ports or offshore terminals under the jurisdiction of another Party to the Convention and every fixed or floating platform shall be provided with a Garbage Record Book. The Garbage Record Book, whether as a part of the ship's official log-book or otherwise, shall be in the form specified in the appendix to this Annex:

¹ Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19) and amended by A.882(21); see IMO sales publication IA650E.

² Refer to the Guidelines for the development of garbage management plans adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.71(38); see MEPC/Circ.317 and IMO sales publication IA656E.

- .1 Each discharge into the sea or to a reception facility, or a completed incineration, shall be promptly recorded in the Garbage Record Book and signed for on the date of the discharge or incineration by the officer in charge. Each completed page of the Garbage Record Book shall be signed by the master of the ship. The entries in the Garbage Record Book shall be at least in English, French or Spanish. Where the entries are also made in an official language of the State whose flag the ship is entitled to fly, the entries in that language shall prevail in case of a dispute or discrepancy;
 - .2 The entry for each discharge or incineration shall include date and time, position of the ship, category of the garbage and the estimated amount discharged or incinerated;
 - .3 The Garbage Record Book shall be kept on board the ship or the fixed or floating platform, and in such a place as to be readily available for inspection at all reasonable times. This document shall be preserved for a period of at least two years from the date of the last entry made in it;
 - .4 In the event of any discharge or accidental loss referred to in regulation 7 of this Annex an entry shall be made in the Garbage Record Book, or in the case of any ship of less than 400 gross tonnage, an entry shall be made in the ship's official log-book, of the location, circumstances of, and the reasons for the discharge or loss, details of the items discharged or lost, and the reasonable precautions taken to prevent or minimize such discharge or accidental loss.
- 4 The Administration may waive the requirements for Garbage Record Books for:
- .1 Any ship engaged on voyages of one (1) hour or less in duration which is certified to carry 15 or more persons; or
 - .2 Fixed or floating platforms.
- 5 The competent authority of the Government of a Party to the Convention may inspect the Garbage Record Books or ship's official log-book on board any ship to which this regulation applies while the ship is in its ports or offshore terminals and may make a copy of any entry in those books, and may require the master of the ship to certify that the copy is a true copy of such an entry. Any copy so made, which has been certified by the master of the ship as a true copy of an entry in the ship's Garbage Record Book or ship's official log-book, shall be admissible in any judicial proceedings as evidence of the facts stated in the entry. The inspection of a Garbage Record Book or ship's official log-book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.
- 6 The accidental loss or discharge of fishing gear as provided for in regulations 7.1.3 and 7.1.3*bis* which poses a significant threat to the marine environment or navigation shall be reported to the State whose flag the ship is entitled to fly, and, where the loss or discharge occurs within waters subject to the jurisdiction of a coastal State, also to that coastal State.

APPENDIX
FORM OF GARBAGE RECORD BOOK

Name of ship: _____

Distinctive number or letters: _____

IMO No.: _____

Period: _____ From: _____ To: _____

1 Introduction

In accordance with regulation 10 of Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL), a record is to be kept of each discharge operation or completed incineration. This includes discharges into the sea, to reception facilities, or to other ships, as well as the accidental loss of garbage.

2 Garbage and garbage management

Garbage means all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing.

The Guidelines for the Implementation of Annex V of MARPOL³ should also be referred to for relevant information.

3 Description of the garbage

Garbage is to be grouped into categories for the purposes of the Garbage Record Book (or ship's official log-book) as follows:

- A Plastics
- B Food wastes
- C Domestic Wastes
- D Cooking Oil
- E Incinerator ashes
- F Operational wastes

³ Refer to the Guidelines for the Implementation of Annex V of MARPOL 73/78, as amended by resolutions.

- G Cargo residues
- H Animal Carcass(es)
- I Fishing Gear⁴

4 Entries in the Garbage Record Book

4.1 Entries in the Garbage Record Book shall be made on each of the following occasions:

4.1.1 When garbage is discharged to a reception facility⁵ ashore or to other ships:

- .1 Date and time of discharge
- .2 Port or facility, or name of ship
- .3 Categories of garbage discharged
- .4 Estimated amount discharged for each category in cubic metres
- .5 Signature of officer in charge of the operation.

4.1.2 When garbage is incinerated:

- .1 Date and time of start and stop of incineration
- .2 Position of the ship (latitude and longitude) at the start and stop of incineration
- .3 Categories of garbage incinerated
- .4 Estimated amount incinerated in cubic metres
- .5 Signature of the officer in charge of the operation.

4.1.3 When garbage is discharged into the sea in accordance with regulations 4, 5 or 6 of Annex V of MARPOL:

- .1 Date and time of discharge
- .2 Position of the ship (latitude and longitude). Note: for cargo residue discharges, include discharge start and stop positions.
- .3 Category of garbage discharged
- .4 Estimated amount discharged for each category in cubic metres
- .5 Signature of the officer in charge of the operation.

4.1.4 Accidental or other exceptional discharges or loss of garbage into the sea, including in accordance with regulation 7 of Annex V of MARPOL:

- .1 Date and time of occurrence
- .2 Port or position of the ship at time of occurrence (latitude, longitude and water depth if known)
- .3 Categories of garbage discharged or lost
- .4 Estimated amount for each category in cubic metres
- .5 The reason for the discharge or loss and general remarks.

⁴ Refer to Guidelines to be developed by the Organization.

⁵ Ship's masters should obtain from the operator of the reception facilities, which includes barges and trucks, a receipt or certificate specifying the estimated amount of garbage transferred. The receipts or certificates must be kept together with the Garbage Record Book.

4.2 Amount of garbage

The amount of garbage on board should be estimated in cubic metres, if possible separately according to category. The Garbage Record Book contains many references to estimated amount of garbage. It is recognized that the accuracy of estimating amounts of garbage is left to interpretation. Volume estimates will differ before and after processing. Some processing procedures may not allow for a usable estimate of volume, e.g., the continuous processing of food waste. Such factors should be taken into consideration when making and interpreting entries made in a record.

RECORD OF GARBAGE DISCHARGES

Ship's name: _____

Distinctive No., or letters: _____

IMO No.: _____

Garbage categories:

- A. Plastics
- B. Food wastes
- C. Domestic wastes (e.g., paper products, rags, glass, metal, bottles, crockery, etc.)
- D. Cooking oil
- E. Incinerator Ashes
- F. Operational wastes
- G. Cargo residues
- H. Animal Carcass(es)
- I. Fishing gear

NEW TABLE LAYOUT AS BELOW:

Date/ Time	Position of the Ship/Remarks (e.g., accidental loss)	Category	Estimated Amount Discharged or Incinerated	To Sea	To Reception Facility	Incineration	Certification/ Signature

Master's signature: _____ Date: _____

ANNEX 24**RESOLUTION MEPC.219(63)**
Adopted on 2 March 2012**2012 GUIDELINES FOR THE IMPLEMENTATION OF MARPOL ANNEX V**

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 the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78) relating thereto provides regulations for the prevention of pollution by garbage from ships,

NOTING that the Committee, at its twenty-sixth session, approved the Guidelines for the Implementation of Annex V of MARPOL 73/78,

NOTING ALSO that the Committee, at its thirty-third session, adopted the Revised Guidelines for the Implementation of Annex V of MARPOL 73/78 (the Revised Guidelines) by resolution MEPC.59(33), which were further amended by resolution MEPC.92(45), adopted at its forty-fifth session,

NOTING FURTHER that the Committee, at its sixty-second session, adopted the revised MARPOL Annex V by resolution MEPC.201(62), which is expected to enter into force on 1 January 2013,

RECOGNIZING the need to review the Revised Guidelines in light of the revised MARPOL Annex V,

HAVING CONSIDERED, at its sixty-third session, the draft 2012 Guidelines for the Implementation of MARPOL Annex V,

1. ADOPTS the 2012 Guidelines for the Implementation of MARPOL Annex V, the text of which is set out in the annex to this resolution;
2. INVITES Governments, in implementation of the provisions of the revised MARPOL Annex V, to take into account the 2012 Guidelines for the Implementation of MARPOL Annex V, upon the entry into force of the revised MARPOL Annex V; and
3. REVOKES the Revised Guidelines for the Implementation of Annex V of MARPOL 73/78 (resolution MEPC.59(33), as amended by resolution MEPC.92(45)), upon the entry into force of the revised MARPOL Annex V.

ANNEX

2012 GUIDELINES FOR THE IMPLEMENTATION OF MARPOL ANNEX V

PREFACE

The main objectives of these guidelines are to assist:

- .1 governments in developing and enacting domestic laws which implement Annex V;
- .2 shipowners, ship operators, ships' crews, cargo owners and equipment manufacturers in complying with requirements set forth in Annex V and relevant domestic laws; and
- .3 port and terminal operators in assessing the need for, and providing, adequate reception facilities for garbage generated on all types of ships. In the interest of uniformity, governments are requested to refer to these guidelines and related International Maritime Organization guidance¹ when developing and enforcing appropriate national regulations.

1 INTRODUCTION

1.1 The revised MARPOL Annex V with an entry into force date of 1 January 2013, prohibits the discharge of all types of garbage into the sea unless explicitly permitted under the Annex. These guidelines have been developed taking into account the regulations set forth in Annex V, as amended, of the International Convention for the Prevention of Pollution from Ships, (MARPOL) (hereinafter referred to as the "Convention"). The purpose of these guidelines is to provide guidance to governments, shipowners, ship operators, ships' crews, cargo owners, port reception facility operators and equipment manufacturers. The guidelines are divided into the following six sections that provide a general framework upon which governments can formulate programmes:

- Introduction;
- Garbage management;
- Management of cargo residues of solid bulk cargoes;
- Training, education and information;
- Port reception facilities for garbage; and
- Enhancement of compliance with MARPOL Annex V.

¹ Comprehensive Manual on Port Reception Facilities, 1999 Edition; MEPC.83(44), Guidelines for ensuring the Adequacy of Port Waste Reception Facilities; and MEPC.1/Circ.671, 20 July 2009, Guide to Good Practice for Port Reception Facility Providers and Users Guidelines.

1.2 Under the revised MARPOL Annex V, discharge of all garbage is now prohibited, except as specifically permitted in regulations 3, 4, 5 and 6 of MARPOL Annex V. MARPOL Annex V reverses the historical presumption that garbage may be discharged into the sea based on the nature of the garbage and defined distances from shore. Regulation 7 provides limited exceptions to these regulations in emergency and non-routine situations. Generally, discharge is restricted to food wastes, identified cargo residues, animal carcasses, and identified cleaning agents and additives and cargo residues entrained in washwater which are not harmful to the marine environment. It is recommended that ships use port reception facilities as the primary means of discharge for all garbage.

1.3 Recognizing that the Annex V regulations continue to restrict the discharge of garbage into the sea, require garbage management for ships, and that garbage management technology continues to evolve, it is recommended that governments and the Organization continue to gather information and review these guidelines periodically.

1.4 Regulation 8 of MARPOL Annex V provides that Governments must ensure the provision of adequate port reception facilities for garbage from ships and should facilitate and promote their use. Section 5 provides guidelines for these facilities.

1.5 The Convention provides definitions for terms used throughout these guidelines. Section 1.6 includes relevant aspects of these definitions, followed by other definitions which are useful for these guidelines.

1.6 Definitions

1.6.1 **Dishwater** means the residue from the manual or automatic washing of dishes and cooking utensils which have been pre-cleaned to the extent that any food particles adhering to them would not normally interfere with the operation of automatic dishwashers.

1.6.2 **Grey water** means drainage from dishwater, shower, laundry, bath and washbasin drains. It does not include drainage from toilets, urinals, hospitals, and animal spaces, as defined in regulation 1.3 of MARPOL Annex IV (sewage), and it does not include drainage from cargo spaces. Grey water is not considered garbage in the context of Annex V.

1.6.3 **Recycling** means the activity of segregating and recovering components and materials for reprocessing.

1.6.4 **Reuse** means the activity of recovering components and materials for further use without reprocessing.

1.7 Application

1.7.1 This section provides clarification as to what should and should not be considered garbage under MARPOL Annex V.

1.7.2 Ash and clinkers from shipboard incinerators and coal-burning boilers should be considered as operational wastes within the meaning of regulation 1.12 of MARPOL Annex V, and therefore are included in the term garbage, within the meaning of regulation 1.9 of MARPOL Annex V.

1.7.3 The definition of "operational wastes" (regulation 1.12 of MARPOL Annex V) excludes grey water, bilge water, or other similar discharges essential to the operation of a ship. "Other similar discharges" essential to the operation of a ship include, but are not limited to the following:

- boiler/economizer blowdown;
- boat engine wet exhaust;
- chain locker effluent;
- controllable pitch propeller and thruster hydraulic fluid and other oil to sea interfaces (e.g. thruster bearings, stabilizers, rudder bearings, etc.);
- distillation/reverse osmosis brine;
- elevator pit effluent;
- firemain systems water;
- freshwater lay-up;
- gas turbine washwater;
- motor gasoline and compensating discharge;
- machinery wastewater;
- pool, spa water and recreational waters;
- sonar dome discharge; and
- welldeck discharges.

1.7.4 While cleaning agents and additives contained in hold washwater, and deck and external surface washwater are considered "operational wastes" and thus "garbage" under Annex V, these cleaning agents and additives may be discharged into the sea so long as they are not harmful to the marine environment.

1.7.5 A cleaning agent or additive is considered not harmful to the marine environment if it:

- .1 is not a "harmful substance" in accordance with the criteria in MARPOL Annex III; and
- .2 does not contain any components which are known to be carcinogenic, mutagenic or reprotoxic (CMR).

1.7.6 The ship's record should contain evidence provided by the producer of the cleaning agent or additive that the product meets the criteria for not being harmful to the marine environment. To provide an assurance of compliance, a dated and signed statement to this effect from the product supplier would be adequate for the purposes of a ship's record. This might form part of a Safety Data Sheet or be a stand-alone document but this should be left to the discretion of the producer concerned.

1.7.7 Releasing small quantities of food into the sea for the specific purpose of fish feeding in connection with fishing or tourist operations should not be considered a discharge of garbage in the context of Annex V.

1.7.8 Fishing gear that is released into the water with the intention for later retrieval, such as fish aggregating devices (FADs), traps and static nets, should not be considered garbage or accidental loss in the context of Annex V.

2 GARBAGE MANAGEMENT

2.1 Waste Minimization

2.1.1 All shipowners and operators should minimize taking onboard material that could become garbage. Ship-specific garbage minimization procedures should be included in the Garbage Management Plan. It is recommended that manufacturers, cargo owners, ports and terminals, shipowners and operators and governments consider the management of garbage associated with ships' supplies, provisions, and cargoes as needed to minimize the generation of garbage in all forms.

2.1.2 When making supply and provisioning arrangements, shipowners and operators, where possible, with the ships suppliers should consider the products being procured in terms of the garbage they will generate. Options that should be considered to decrease the amount of such garbage include the following:

- .1 using supplies that come in bulk packaging, taking into account factors such as adequate shelf-life (once a container is open) to avoid increasing garbage associated with such products;
- .2 using supplies that come in reusable or recyclable packaging and containers; avoiding the use of disposable cups, utensils, dishes, towels and rags and other convenience items whenever possible; and
- .3 avoiding supplies that are packaged in plastic, unless a reusable or recyclable plastic is used.

2.1.3 When considering selection of materials for stowage and securing of cargo or protection of cargo from the weather, shipowners and operators should consider how much garbage such materials will generate. Options that should be considered to decrease the amount of such garbage include the following:

- .1 using permanent reusable coverings for cargo protection instead of disposable or recyclable plastic sheeting;
- .2 using stowage systems and methods that reuse dunnage, shoring, lining and packing materials; and

- .3 discharging to port reception facilities the dunnage, lining and packaging materials generated in port during cargo activities as its discharge into the sea is not permitted.

2.1.4 Governments are encouraged to undertake research and technology development to minimize potential garbage and its impacts on the marine environment. Suggested areas for such study are listed below:

- .1 development of recycling technology and systems for all types of materials that may be returned to shore as garbage; and
- .2 development of technology for use of biodegradable materials to replace current plastic products as appropriate. In connection with this, governments should also study the impacts on the environment of the products from degradation of such new materials.

2.2 Fishing gear

2.2.1 Lost fishing gear may harm the marine environment or create a navigation hazard. Fishing vessel operators are required to record the discharge or loss of fishing gear in the Garbage Record Book or Ship's log as specified within regulations 7.1 and 10.3.4 of MARPOL Annex V.

2.2.2 Fishing vessel operators are further required to report the accidental loss or discharge of fishing gear which poses a significant threat to the marine environment and navigation. Reports should be made to the flag State, and where appropriate, the coastal State in whose jurisdiction the loss of the fishing gear occurred, as specified in regulation 10.6 of MARPOL Annex V:

- .1 the accidental loss or discharge of fishing gear which is required to be reported by regulation 10.6 of MARPOL Annex V should be determined specifically by the government. For such determination, the government is encouraged to consider various factors including: (1) the amount of the gear lost or discharged and (2) the conditions of the marine environment where it was lost or discharged. Comprehensive consideration is needed on the characteristics of the gear that was lost, including types, size (weight and/or length), quantity, material (especially, synthetic/plastic or not), buoyancy. In addition, governments should consider the impact of the fishing gear in different locations in order to assess whether the lost gear represents a significant threat to the marine environment or navigation, taking into account the vulnerability of habitat and protected species to gear interactions. Governments are encouraged to report to IMO their measures taken for this issue with a view to promoting information sharing and opinion exchange among governments and relevant International Organizations. Further, governments are encouraged to report to IMO, progress made in implementing these measures, including summaries of where gear was lost and, if applicable, actions taken to address the gear loss;
- .2 examples of lost or abandoned fishing gear which could be considered to pose a significant threat to the marine environment include whole or nearly whole large fishing gear or other large portions of gear. In determining the threat to the marine environment, governments should give careful consideration to the impact of gear in sensitive areas, such as coral reefs, and in areas where interactions would have higher risks of detrimental impacts, such as foraging or breeding areas for protected species;

- .3 governments are encouraged to develop communication frameworks to enable the recording and sharing of information on fishing gear loss where necessary in order to reduce loss and facilitate recovery of fishing gear. Governments are further encouraged to develop frameworks to assist fishing vessels in reporting the loss of gear to the flag State and to a coastal State. Such frameworks should take into consideration implementation challenges in small scale and artisanal fisheries and recreational operations;
- .4 fishing industry, relevant international organizations and governments are encouraged to undertake such research, technology development, information sharing and management measures as may be needed to minimize the probability of loss, and maximize the probability of retrieval of fishing gear from the sea; and
- .5 governments should encourage vessel operators to implement appropriate onboard storage and handling of fishing gear, and should also consider relevant guidance from FAO and IMO.

2.3 Shipboard garbage handling (collection, processing, storage, discharge)

2.3.1 Regulation 3 of MARPOL Annex V provides that the discharge of garbage into the sea is prohibited, with limited exceptions, as summarized in table 1. Under certain conditions discharge into the sea of food wastes, animal carcasses, cleaning agents and additives contained in hold washwater, deck and external surface washwater and cargo residues which are not considered to be harmful to the marine environment is permitted.

TABLE 1 – SUMMARY OF RESTRICTIONS TO THE DISCHARGE OF GARBAGE INTO THE SEA UNDER REGULATIONS 4, 5 AND 6 OF MARPOL ANNEX V

(Note: Table 1 is intended as a summary reference. The provisions in MARPOL Annex V, not table 1, prevail.)

Garbage type ¹	All ships except platforms ⁴		Offshore platforms located more than 12 nm from nearest land and ships when alongside or within 500 metres of such platforms ⁴ Regulation 5
	Outside special areas Regulation 4 (Distances are from the nearest land)	Within special areas Regulation 6 (Distances are from nearest land or nearest ice-shelf)	
Food waste comminuted or ground ²	≥3 nm, en route and as far as practicable	≥12 nm, en route and as far as practicable ³	Discharge permitted
Food waste not comminuted or ground	≥12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5, 6} not contained in washwater	≥ 12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5, 6} contained in washwater		≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2)	
Cleaning agents and additives ⁶ contained in cargo hold washwater	Discharge permitted	≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2)	Discharge prohibited

Garbage type ¹	All ships except platforms ⁴		Offshore platforms located more than 12 nm from nearest land and ships when alongside or within 500 metres of such platforms ⁴ Regulation 5
	Outside special areas Regulation 4 (Distances are from the nearest land)	Within special areas Regulation 6 (Distances are from nearest land or nearest ice-shelf)	
Cleaning agents and additives ⁵ in deck and external surfaces washwater		Discharge permitted	
Animal Carcasses (should be split or otherwise treated to ensure the carcasses will sink immediately)	Must be en route and as far from the nearest land as possible. Should be >100 nm and maximum water depth	Discharge prohibited	Discharge prohibited
All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse	Discharge prohibited	Discharge prohibited	Discharge prohibited

- 1 When garbage is mixed with or contaminated by other harmful substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply.
- 2 Comminuted or ground food wastes must be able to pass through a screen with mesh no larger than 25 mm.
- 3 The discharge of introduced avian products in the Antarctic area is not permitted unless incinerated, autoclaved or otherwise treated to be made sterile.
- 4 Offshore platforms located 12 nm from nearest land and associated ships include all fixed or floating platforms engaged in exploration or exploitation or associated processing of seabed mineral resources, and all ships alongside or within 500 m of such platforms.
- 5 Cargo residues means only those cargo residues that cannot be recovered using commonly available methods for unloading.
- 6 These substances must not be harmful to the marine environment.

2.3.2 Compliance with Annex V involves personnel, equipment and procedures for collecting, sorting, processing, storing, recycling, reusing and discharging garbage. Economic and procedural considerations associated with these activities include storage space requirements, sanitation, equipment and personnel costs and in port garbage service charges.

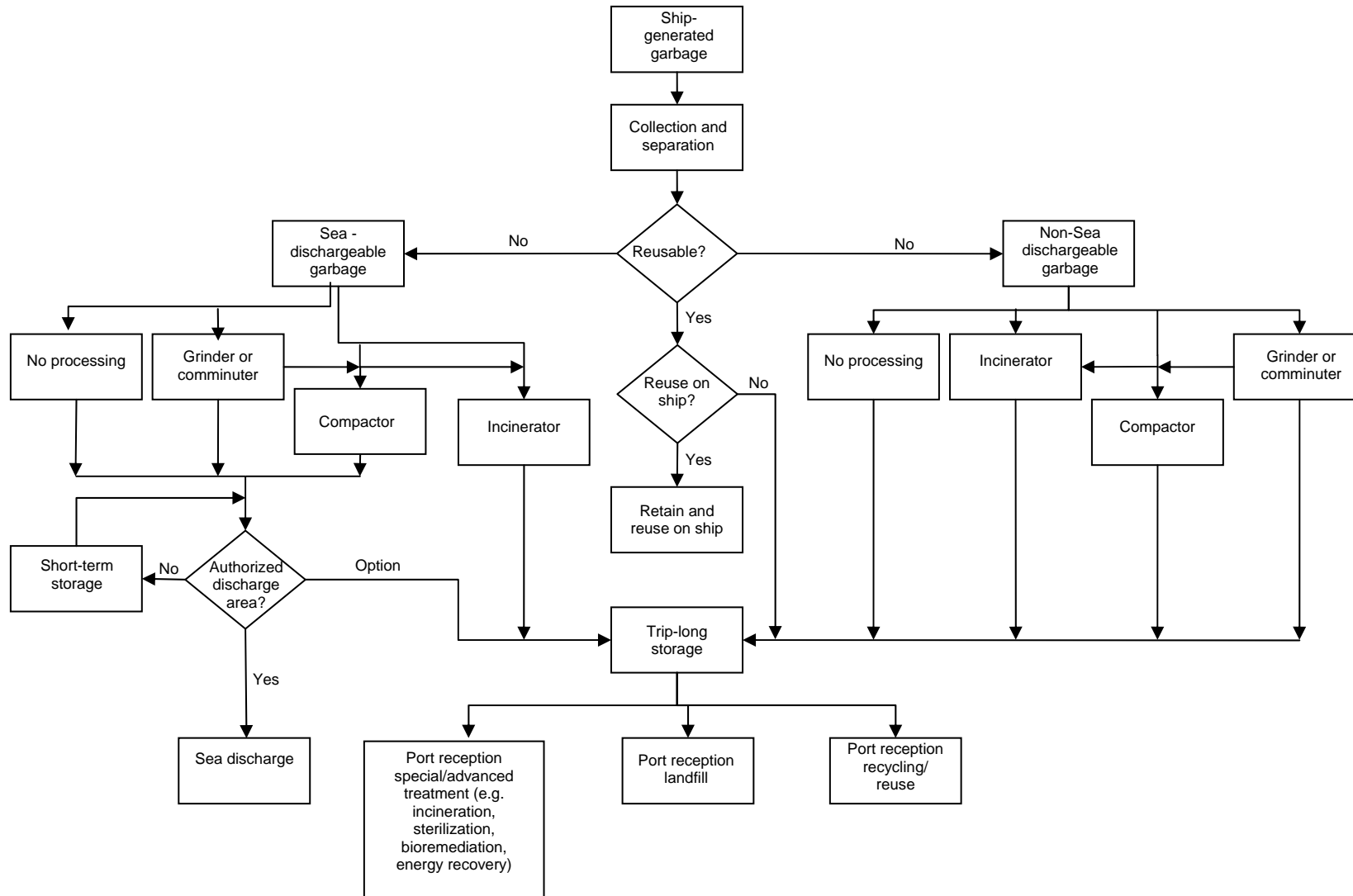
2.3.3 Compliance with the provisions of Annex V involves careful planning by the ship's owner and operator and proper execution by crew members as well as other seafarers. The most appropriate procedures for handling and storing garbage on board ships may vary depending on factors such as the type and size of the ship, the area of operation (e.g. special area, distance from nearest land or ice-shelf), shipboard garbage processing equipment and storage space, number of crew or passengers, duration of voyage, and regulations and reception facilities at ports of call. However, in view of the cost involved with the different garbage handling options, it is economically advantageous to first, limit the

amount of material that may become garbage from being brought on board the ship and second, separate garbage eligible for discharge into the sea from other garbage that may not be discharged into the sea. Proper management of containers and packaging coming on board and proper handling and storage can minimize shipboard storage space requirements and enable efficient transfer of retained garbage to port reception facilities for proper handling (i.e. recycling, reuse) or land-based disposal.

2.3.4 Every ship of 100 gross tonnage and above, and every ship certified to carry 15 or more persons, and fixed and floating platforms are required to carry and implement a garbage management plan that specifies procedures to be followed to ensure proper and efficient handling and storage of garbage. A garbage management plan² should be developed that can be incorporated into crew and ship operating manuals. Such manuals should identify crew responsibilities (including an Environmental Control Officer) and procedures for all aspects of handling and storing garbage on board the ship. Procedures for handling ship-generated garbage are divided into four phases: collection, processing, storage, and discharge. A generalized garbage management plan for handling and storing ship-generated garbage is presented in table 2. Specific procedures for each phase are discussed below.

² Garbage management plans are mandatory on certain ships in accordance with regulation 10 of Annex V of MARPOL 73/78.

Table 2: Options for shipboard handling and discharge of garbage



2.4 Collection

2.4.1 Procedures for collecting garbage generated on board should be based on the consideration of what is permitted and what is not permitted to be discharged into the sea while en route, and whether a particular garbage type can be discharged to port facilities for recycling or reuse. The details of these procedures should be written in the garbage management plan.

2.4.2 To reduce or avoid the need for sorting after collection and to facilitate recycling, it is recommended that distinctively marked garbage receptacles be provided on board the ship to receive garbage as it is generated. Receptacles on board can be in the form of drums, metal bins, cans, container bags, or wheelie bins. Any receptacles on deck areas, poop decks or areas exposed to the weather should be secured on the ship and have lids that are tight and securely fixed. All garbage receptacles should be secured to prevent loss, spillage, or loss of any garbage that is deposited in the receptacles. Receptacles should be clearly marked and distinguishable by graphics shape, size, or location. Receptacles should be placed in appropriate spaces throughout the ship (e.g. the engine-room, mess deck, wardroom, galley, and other living or working spaces) and all crew members and passengers should be advised of what garbage should and should not be placed in them.

2.4.3 The recommended garbage types that should be separated are:

- non-recyclable plastics and plastics mixed with non-plastic garbage;
- rags;
- recyclable material:
 - cooking oil;
 - glass;
 - aluminium cans;
 - paper, cardboard, corrugated board;
 - wood;
 - metal;
 - plastics; (including styrofoam or other similar plastic material); and
- garbage that might present a hazard to the ship or crew (e.g. oily rags, light bulbs, acids, chemical, batteries, etc.).

2.4.4 Crew responsibilities should be assigned for collecting or emptying these receptacles and taking the garbage to the appropriate processing or storage location. Use of such a system facilitates subsequent shipboard processing and minimizes the amount of garbage which must be stored on board ship for return to port.

Plastics and plastics mixed with non-plastic garbage

2.4.5 Plastics are used for a variety of marine purposes including, but not limited to, packaging (vapour-proof barriers, bottles, containers, liners, bags, cargo wrapping material, foam cushioning material, etc.); ship construction (fibreglass and laminated structures, siding, piping, insulation, flooring, carpets, fabrics, paints and finishes, adhesives, electrical and electronic components, etc.); disposable eating utensils (styrofoam plates, bowls, food containers, cups, etc.); bags; sheeting; floats; fishing nets; fishing lines; strapping bands; wire rope with synthetic fibre sheaths; combination wire rope; rope; line; sails; and many other manufactured plastic items.

2.4.6 Regulation 3.2 of Annex V prohibits the discharge of all plastics into the sea. When plastic is mixed with other garbage, the mixture must be treated as if it were all plastic. The most stringent procedures for the handling and discharge should be followed taking into account the applicable provisions of the garbage management plan.

Food wastes

2.4.7 Some governments have regulations for controlling human, plant, and animal diseases that may be carried by foreign food wastes and materials that have been associated with them (e.g. food packing and disposable eating utensils, etc.). These regulations may require incinerating, sterilizing, double bagging or other special treatment of garbage to destroy possible pest and disease organisms. This type of garbage should be kept separate from other garbage and preferably retained for discharge at port reception facilities in accordance with the laws of the receiving country. Governments are reminded of their obligation to ensure the provision of adequate reception facilities. Precautions must be taken to ensure that plastics contaminated by food wastes (e.g. plastic food wrappers) are not discharged into the sea with other food wastes.

Synthetic fishing net and line scraps

2.4.8 As regulation 3.2 of MARPOL Annex V prohibits the discharge into the sea of synthetic fishing net and line scraps generated by the repair or operation of fishing gear, these items should be collected in a manner that avoids their loss overboard. Such material may be incinerated, compacted, or stored along with other plastics or it may be preferable to keep it separate from other types of garbage if it has strong odour or is present in great volume. Unless such garbage is appropriately incinerated, the atmospheric incineration products could be toxic. Onboard incineration should follow regulation 16 of MARPOL Annex VI.

Recovery of garbage at sea

2.4.9 Seafarers are encouraged to recover persistent garbage from the sea during routine operations as opportunities arise and prudent practice permits, and they are encouraged to retain the material for discharge to port reception facilities.

2.5 Processing

2.5.1 Depending on factors such as the type of ship, area of operation, number of crew or passengers, etc., ships may be equipped with incinerators³, compactors, comminuters, or other devices for shipboard garbage processing (see sections 2.8 to 2.11). Appropriate members of the crew should be trained and assigned responsibility for operating this equipment on a schedule commensurate with ship needs. In selecting appropriate processing procedures, the following should be considered.

2.5.2 Use of compactors, incinerators, comminuters, and other such devices has a number of advantages, such as, reducing shipboard space requirements for storing garbage, and making it easier to discharge garbage at port reception facilities.

2.5.3 It should be noted that special rules on incineration under domestic law may apply in some ports and may exist in some special areas. Incineration of hazardous materials (e.g. scraped paint, impregnated wood) and certain types of plastics (e.g. PVC-based plastics or other plastics containing hazardous chemicals) calls for special precaution due to

³ Refer to resolution MEPC.76(40), "Standard specification for shipboard incinerators". Amended by resolution MEPC.93(45).

the potential environmental and health effects from combustion of by-products. The problems of combustion of by-products are discussed in 2.11.3.

2.5.4 Ships operating primarily in special areas or within three nautical miles from the nearest land or ice-shelf are greatly restricted in what they can discharge. These ships should choose between storage of either compacted or uncompacted material for discharging at port reception facilities or incineration with retention of ash and clinkers. The type of ship and the expected volume and type of garbage generated determine the suitability of compaction, incineration or storage options.

2.6 Storage

2.6.1 Garbage collected from throughout the ship should be delivered to designated processing or storage locations. Garbage that must be returned to port for discharge at port reception facilities may require storage until arrangements can be made to discharge it ashore for appropriate processing. In all cases, garbage should be stored in a manner which avoids health and safety hazards. The following points should be considered when selecting procedures for storing garbage:

- .1 sufficient storage space and equipment (e.g. cans, drums, bags or other containers) should be provided. Where storage space is limited, ship operators are encouraged to consider the installation of compactors or incinerators. To the extent possible, all processed and unprocessed garbage stored for any length of time should be in tight, securely covered containers in order to prevent the unintentional discharge of stored garbage;
- .2 food wastes and other garbage to be returned to port and which may carry diseases or pests should be stored in tightly covered containers and be kept separate from garbage which does not contain such food wastes. Quarantine arrangements in some countries may require double bagging of this type of waste. Both types of garbage should be stored in separate clearly marked containers to avoid incorrect discharge and facilitate proper handling and treatment on land; and
- .3 cleaning and disinfecting are both preventative and remedial pest control methods that should be applied regularly in garbage storage areas.

2.7 Discharge

2.7.1 Although discharge into the sea of limited types of garbage is permitted under Annex V, discharge of garbage to port reception facilities should be given primary consideration. When discharging garbage, the following points should be considered:

- .1 regulations 4, 5, and 6 of MARPOL Annex V, summarized in table 1, set forth the requirements for garbage permitted to be discharged into the sea. In general the discharge shall take place when the ship is en route and as far as practicable from the nearest land. Attempts should be made to spread the discharge over as wide an area as possible and in deep water (50 metres or more). Prevailing currents and tidal movements should be taken into consideration when discharging into the sea is permitted; and

- .2 to ensure timely transfer of large quantities of ship-generated garbage to port reception facilities, it is essential for shipowners, operators or their agents to make arrangements well in advance for garbage reception. At the same time, discharge needs should be identified in order to make arrangements for garbage requiring special handling or other necessary arrangements. Advice should be provided to the port of the type of garbage to be discharged and whether it is separated and the estimated amounts. The port may have special discharge requirements for food wastes and related garbage which may carry certain disease or pest organisms, dunnage, batteries, medicines, outdated pyrotechnics or unusually large, heavy, or odorous derelict fishing gear, etc.

2.8 Shipboard equipment for processing garbage

2.8.1 The choice of options⁴ for garbage processing depends largely upon personnel limitations, generation rate, capacity, vessel configuration, voyage route and availability of port reception facilities. The type of equipment available for shipboard garbage handling includes incinerators, compactors, comminuters and their associated hardware.

2.9 Grinding or comminution

2.9.1 The discharge of comminuted food wastes may be permitted under regulations 4.1.1 and 6.1.1 of MARPOL Annex V whilst the ship is en route. Such comminuted or ground food waste must be capable of passing through a screen with openings no greater than 25 mm.

2.9.2 A wide variety of food waste grinders is available on the market and most modern ships' galleys have the equipment needed to produce a slurry of food particles and water that washes easily through the required 25 mm screen. Output ranges from 10 to 250 litres per minute. The discharge from shipboard comminuters should be directed into an appropriately constructed holding tank when the vessel is operating within an area where discharge is prohibited.

2.9.3 Size reduction of certain other garbage items can be achieved by shredding or crushing and machines for carrying out this process are available for use on board ships.

2.9.4 Information on the development, advantages and use of comminuters for processing food waste aboard ships should be forwarded to the Organization for sharing between interested parties.

2.9.5 Outside special areas, ships operating primarily beyond three nautical miles from the nearest land are encouraged to install and use comminuters to grind food wastes to a particle size capable of passing through a screen with openings no larger than 25 mm. Regulation 4 requires comminuting or grinding food wastes if the food wastes are to be discharged between three and 12 nautical miles from the nearest land. Although unprocessed food wastes may be discharged beyond 12 nautical miles, it is recommended that comminuters be used as they hasten assimilation into the marine environment. Because food wastes comminuted with plastics cannot be discharged into the sea, all plastic materials need to be removed before food wastes are placed into a comminuter or grinder.

⁴ Reference may also be made to other technical guidance such as, ISO/CD21070 Ships and marine technology – Marine environment protection – Management and handling of shipboard garbage.

2.9.6 When operating *inside* a special area, regulation 6 of MARPOL Annex V requires all food wastes to be comminuted or ground prior to discharge in to the sea. All discharges are to be as far as practicable and not less than 12 nautical miles from the nearest land or ice-shelf.

2.10 Compaction

Table 3 shows compaction options for various types of garbage.

Table 3 – Compaction options for shipboard-generated garbage

Examples of garbage	Special handling by vessel personnel before compaction	Compaction characteristics			Onboard storage space
		Rate of alteration	Retainment of compacted form	Density of compacted form	
Metal, food and beverage containers, glass, small wood pieces	None	Very rapid	Almost 100%	High	Minimum
Comminuted plastics, fibre and paper board	Minor – reduce material to size for feed, minimal manual labour	Rapid	Approximately 80%	Medium	Minimum
Small metal drums ⁵ , uncomminuted cargo packing, large pieces of wood	Moderate – longer manual labour time required to size material for feed	Slow	Approximately 50%	Relatively low	Moderate
Uncomminuted plastics	Major – very long manual labour time to size material for feed; usually impractical	Very slow	Less than 10%	Very low	Maximum
Bulky metal cargo containers, thick metal items	Impractical for shipboard compaction; not feasible	Not applicable	Not applicable	Not applicable	Maximum

⁵ Small and large drums can be compacted very easily with the proper device – a large number of these devices have been designed for remote locations, and therefore they are small and easy to operate with excellent results. It should be noted, that the compaction of drums is probably restricted to larger vessels, due to lack of space on smaller (fishing) vessels.

2.10.1 Most garbage can be compacted to some degree; the exceptions include unground plastics, fibre and paper board, bulky cargo containers and thick metal items. Pressurized containers should not be compacted or shredded without the use of specialized equipment designed for this purpose because they present an explosion hazard in standard compactors.

2.10.2 Compaction reduces the volume of garbage. In most cases, the output from a compactor is a block of material which facilitates the shipboard storage of garbage and its discharging of the material in a port facility. It should be taken into account that the output from a compactor might be subject to quarantine, sanitary or health requirements or other requirements from the port reception facilities and advice from local authorities should be sought on any standards or requirements which are additional to those set by the Organization.

2.10.3 Compactors have options including sanitizing, deodorizing, adjustable compaction ratios, bagging in plastic or paper, boxing in cardboard (with or without plastic or wax paper lining), baling, etc. Compacted materials should be stored appropriately. While metal and plastic bales can get wet, paper and cardboard bales should be kept dry.

2.10.4 If grinding machines are used prior to compaction, the compaction ratio can be increased and the storage space decreased. Careful investigation of the appropriate compaction machine should be undertaken, based on the type and volume of material that will be compacted, as not all compactors require grinding. Compaction is just one step in the solid waste management scheme and the shipowner/operator should ensure all phases of garbage management are described in their Garbage Management Plan. Proper care should be taken when handling and storing binder wrap to prevent it from accidentally entering the marine environment.

2.10.5 A compactor should be installed in a compartment with adequate room for operating and maintaining the unit and storing garbage to be processed. The compartment should be located adjacent to the areas of food processing and commissary store-rooms. If not already required by regulation, it is recommended that the space should have freshwater wash down service, coamings, deck drains, adequate ventilation and hand or automatic fixed fire-fighting equipment.

2.10.6 Information on the development and use of shipboard compactors should be forwarded to the Organization for sharing between interested parties.

2.11 Incineration

2.11.1 Ash and clinkers from shipboard incinerators should be considered as operational waste and, therefore, as garbage that is not eligible for discharge into the sea.

2.11.2 Incineration conducted in a shipboard incinerator can significantly reduce the need to store garbage on board the ship. Shipboard incinerators should be designed, constructed, operated and maintained in accordance with the IMO Standard Specification for Shipboard Incinerators (footnote 3). MARPOL Annex VI requires shipboard incinerators installed after 1 January 2000 to be type approved and meet specific air pollution criteria. Incinerators should only be used to incinerate materials that are specified by the incinerator manufacturer.

2.11.3 In general, shipboard incineration should not be undertaken when the ship is in port or at offshore terminal. Some ports may have domestic laws that specify additional air emission restrictions, particularly those near high population areas. The use of a shipboard incinerator may require permission from the port authority concerned.

2.11.4 Table 4 presents options for incineration of garbage, and includes considerations for special handling by vessel personnel, combustibility, reduction in volume, residual materials, exhaust, and onboard storage space. Most garbage is amenable to incineration with the exception of metal and glass.

Table 4 – Incineration options for shipboard-generated garbage

Examples of garbage	Special handling by vessel personnel ⁶ before incineration	Incineration characteristics				Onboard storage space
		Combustibility	Reduction of volume	Residual	Exhaust	
Paper Packing, food and beverage containers	Minor – easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum
Fibre and paper board	Minor – reduce material to size for feed, minimum manual labour	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum
Plastics packaging, food and beverage containers, etc.	Minor – easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incinerator design	Minimum
Plastics sheeting, netting, rope and bulk material.	Moderate – manual labour time to size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incinerator design	Minimum
Rubber hoses and bulk pieces	Major – manual labour time to size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incinerator design	Minimum
Metal food and beverage containers, etc.	Minor – easy to feed into hopper	Low	Less 10%	Slag	Possibly smoky and not hazardous	Moderate

⁶ Each operator of the onboard garbage incinerator should be trained and familiar in the use of the equipment and the types of garbage that can be destroyed in the incinerator.

Examples of garbage	Special handling by vessel personnel ⁶ before incineration	Incineration characteristics				Onboard storage space
		Combustibility	Reduction of volume	Residual	Exhaust	
Metal cargo, bulky containers, thick metal items	Major – manual labour time to size reduction(not easily incinerated)	Very low	Less 5%	Large metal Fragments and slag	Possibly smoky and not hazardous	Maximum
Glass food and beverage containers, etc.	Minor – easy to feed into hopper	Low	Less 10%	Slag	Possibly smoky and not hazardous	Moderate
Wood, cargo containers and large wood scrapes	Moderate – manual labour time to size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum

2.11.5 Some of the disadvantages of incinerators may include the possible hazardous nature of the ash or vapour, dirty operation, excessive labour required for charging, stoking and ash removal. Some incinerators may not be able to meet air pollution regulations imposed in some ports and harbours or by flag and coastal States when such matters are subject to their jurisdiction. Some of these disadvantages can be remedied by automatic equipment for charging and stoking, however, the additional equipment to perform automatic functions will require more installation space.

2.11.6 The incineration of garbage that contains a large amount of plastic involves very specific incinerator settings such as higher oxygen injection and higher temperatures (850 to 1,200°C). If these special conditions are not met, depending on the type of plastic and conditions of combustion, some toxic gases can be generated in the exhaust stream, including vaporized hydrochloric (HCl) and hydrocyanic (HCN) acids. These and other intermediary products of combustion of waste containing plastics are toxic to humans and marine life.

2.11.7 Onboard incineration of garbage may reduce the volume of garbage subject to quarantine requirements in some countries. However, incinerator ash may still be subject to local quarantine, sanitary or health requirements. Advice should be sought from local authorities regarding requirements that are in addition to MARPOL. For example, higher temperatures and more complete combustion may be required to effectively destroy organisms that present a risk.

2.11.8 Information on the development and advantages on the use of shipboard incinerator systems should be forwarded to the Organization for sharing between interested parties.

2.12 Treatment of animal carcasses

2.12.1 Only fit and healthy animals should be presented for loading as cargo and managed in accordance with international standards for the transport of animals at sea⁷. The master of the ship is expected to have responsibility for shipboard livestock operational issues, animal health and welfare, and conditions for the control and reporting of animal mortality on board.

2.12.2 Ships carrying live animal cargo consignments are expected to have animals that die during a voyage. These mortalities accrue gradually over the voyage and are dependent on various factors including age and type of animal species, facilities on board the ship and local climatic conditions. The most common mortality causes stem from enteritis, refusal to feed, injury, exhaustion, or illness not evident prior to loading. The mortality numbers are generally low and are operational issues to be controlled as part of cargo management practice. These mortalities are considered to be generated during the normal operation of the ship and liable to be discharged of continually or periodically and therefore subject to Annex V regulations.

2.12.3 As part of normal livestock ship management procedures, regular inspections (day and night) are recommended to ensure the health and welfare of the animals. It is recommended that these inspections include shipboard recording, on a daily basis, of the number of animals that have died or have been euthanized.

2.12.4 When mortalities occur on board, the carcasses should be removed from the pen areas and assessed for appropriate disposition. The options for appropriate discharge of the carcasses under Annex V will typically be discharge into the sea or discharge to a reception facility. Where the ship has an appropriate storage area on board, limited quantities of treated carcasses may be stored for short periods for subsequent discharge into the sea or to reception facilities. Any storage on board should take into account occupational health and safety requirements.

2.12.5 Regulation 4.1.4 of MARPOL Annex V permits the discharge into the sea of animal carcasses generated during the normal operation of a ship, but only if the ship is en route, outside a special area, as far as possible from the nearest land and taking into account the guidelines developed by the Organization. To comply with regulation 4.1.4 of MARPOL Annex V, it is recommended that the discharge into the sea should take place greater than 100 nautical miles (nm) from the nearest land and in the maximum water depth possible.

2.12.6 When a ship is on a voyage that is not often greater than 100 nm from nearest land, the retention of carcasses on board during conditions of high temperatures and high humidity may constitute a threat to human health and safety or to the remaining live animals. In these circumstances it may not be possible to discharge animal carcasses in accordance with these guidelines. In such circumstances where the master of the ship determines that such health and safety threats exist, it is recommended the discharge into the sea should take place greater than 12 nm from the nearest land. Where the discharge of animal carcasses at sea occurs under these circumstances, the entry in the Garbage Record Book of the position of the ship should also include a remark about these circumstances.

⁷

The World Organisation for Animal Health (OIE) formulated "Guidelines for the Transport of Animals by Sea" as part of the Terrestrial Animal Health Code (2010).

2.12.7 Animal carcasses should be split or otherwise treated prior to their discharge at sea. Procedures for the treatment of carcasses should take into account the health and safety of the crew and other livestock cargo. Treatment should facilitate the sinking or dispersal of the carcass when it is discharged into the sea.

2.12.8 Treatment of a carcass involves:

- manually slitting or cutting the carcass to the extent that the thoracic and abdominal cavities are opened; or
- passing the carcass through equipment such as a comminuter, grinder, hogger, or mincer.

2.12.9 For each animal carcass incinerated, discharged into the sea or discharged to a reception facility, an entry in the Garbage Record Book shall be made. The entry should include the date/time, position of the ship and remarks to specify the animal species (e.g. sheep, cattle, goats), the category "H" and the number of carcasses discharged. Where the discharge is to a reception facility, the receipt obtained from the facility should be attached to the Garbage Record Book.

2.12.10 Following the completion of a voyage, the master of the ship is encouraged to provide a copy of the pages of the Garbage Record Book that contain the entries for the discharges of animal carcasses at sea to the flag State and the State from whose port the voyage originated, and other information requested.

2.12.11 Governments are encouraged to analyse the garbage records of discharges of animal carcasses and other relevant information to inform and assist future reviews of the Annex V guidelines and regulations.

Mortalities in excess of those generated during the normal operation of a ship

2.12.12 Carcasses of animals resulting from mortalities in excess of those generated during the normal operation of a ship are not "garbage" under Annex V and are not covered under these guidelines. To assist in managing these situations, masters should contact the flag State of the ship and where appropriate, port and/or coastal State(s) to seek guidance on the appropriate legal regimes and requirements, as well as consult relevant IMO guidelines and circulars. In particular, masters should refer to the joint London Convention-London Protocol/MEPC "Guidance on Managing Spoilt Cargoes".

2.12.13 "Mortalities in excess of those generated during the normal operation of a ship" refers to animal mortalities in excess of those described in paragraph 2.12.2. While this could be a number of animals dying at the same time or within a short period of time, the number of mortalities that exceed those generated during the normal operation of a ship will depend upon the animal species and the total number and/or species carried in the consignment.

2.12.14 Circumstances that may result in mortalities that exceed those generated during the normal operation of the ship, include:

- malfunctioning of ventilation or watering systems;
- weather events such as heat waves or storm systems;
- infectious disease outbreaks; and
- refusal of cargo offloading by authorities at destination, leading to the need to euthanize some or all of the live animal cargo.

2.12.15 The guidance provided above and in the LC-LP/MEPC Circular on guidance on managing spoilt cargoes is not a substitute for any stricter requirements imposed upon a ship by a port State, a flag State or the exporting country, for the management of livestock cargoes.

2.13 Discharge of fish carried as a cargo

2.13.1 Fish, including shellfish, carried on board as cargo that have died or been euthanized on board during the voyage are considered to be animal carcasses and should, to the extent practicable, be treated in the manner set out in section 2.12 of these guidelines. Governments may want to consider additional actions to reduce the risk of spreading parasitic or pathogenic organisms.

3 MANAGEMENT OF CARGO RESIDUES OF SOLID BULK CARGOES

3.1 Cargo residues are included in the definition of garbage within the meaning of Annex V, regulation 1.9 and may be discharged in accordance with regulations 4.1.3 and 6.1.2. However, cargo material contained in the cargo hold bilge water should not be treated as cargo residues if the cargo material is not harmful to the marine environment and the bilge water is discharged from a loaded hold through the ship's fixed piping bilge drainage system.

3.2 Cargo residues are considered harmful to the marine environment and subject to regulations 4.1.3 and 6.1.2.1 of the revised MARPOL Annex V if they are residues of solid bulk substances which are classified according to the criteria of the United Nations Globally Harmonized System for Classification and Labelling of Chemicals (UN GHS) meeting the following parameters¹⁾:

- .1 Acute Aquatic Toxicity Category 1; and/or
- .2 Chronic Aquatic Toxicity Category 1 or 2; and/or
- .3 Carcinogenicity²⁾ Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation; and/or
- .4 Mutagenicity²⁾ Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation; and/or
- .5 Reproductive Toxicity²⁾ Category 1A or 1B combined with not being rapidly degradable and having high bioaccumulation; and/or
- .6 Specific Target Organ Toxicity Repeated Exposure²⁾ Category 1 combined with not being rapidly degradable and having high bioaccumulation; and/or
- .7 Solid bulk cargoes containing or consisting of synthetic polymers, rubber, plastics, or plastic feedstock pellets (this includes materials that are shredded, milled, chopped or macerated or similar materials).

Notes:

- 1) The criteria are based on UN GHS, fourth revised edition (2011). For specific products (e.g. metals and inorganic metal compounds) guidance available in UN GHS, annexes 9 and 10 are essential for proper interpretation of the criteria and classification and should be followed.
- 2) Products that are classified for Carcinogenicity, Mutagenicity, Reproductive toxicity or Specific Target Organ Toxicity Repeated Exposure for oral and dermal hazards or without specification of the exposure route in the hazard statement.

3.3 Cargo residues that are harmful to the marine environment may require special handling not normally provided by reception facilities. Ports and terminals receiving such cargoes should have adequate reception facilities for all relevant residues, including when contained in washwater.

3.4 Solid bulk cargoes should be classified and declared by the shipper as to whether or not they are harmful to the marine environment. Such declaration should be included in the information required in section 4.2 of the IMSBC Code.

3.5 Ports, terminals and ship operators should consider cargo loading, unloading and onboard handling practices⁸ in order to minimize production of cargo residues. Cargo residues are created through inefficiencies in loading, unloading, onboard handling. Options that should be considered to decrease the amount of such garbage include the following:

- .1 ensuring ships are suitable to carry the intended cargo and also suitable for unloading the same cargo using conventional unloading methods;
- .2 unloading cargo as efficiently as possible, utilizing all appropriate safety precautions to prevent injury or ship and equipment damage and to avoid or minimize cargo residues; and
- .3 minimizing spillage of the cargo during transfer operations by carefully controlling cargo transfer operations, both on board and from dockside. This should include effective measures to enable immediate communications between relevant ship and shore-based personnel during the transfer operations and when feasible, enclosure of conveyance devices such as conveyor belts. Since this spillage typically occurs in port, it should be completely cleaned up immediately following the loading and unloading event and handled as cargo; delivering it into the intended cargo space or into the appropriate unloading holding area.

3.6 When the master, based on the information received from the relevant port authorities, determines that there are no adequate reception facilities⁹ at either the port of departure or the port of destination in the case where both ports are situated within the same special area, the condition under regulation 6.1.2.3 should be considered satisfied.

3.7 MARPOL Annex V, regulation 6.1.2 also applies when the "port of departure" and the "next port of destination" is the same port. To discharge cargo hold washwater in this situation, the ship must be en route and the discharge must take place not less than 12 miles from the nearest land.

4 TRAINING, EDUCATION AND INFORMATION

4.1 These guidelines are intended to address governments, shipowners, ship operators, ships' crews, cargo owners, port reception facility operators and equipment manufacturers as sources of pollution of the sea by garbage. Accordingly, governments should develop and undertake training, education and public information programmes suited for all seafaring communities under their jurisdiction, prepared and presented in such a way that they communicate with that segment of the community.

⁸ Refer to the International Maritime Solid Bulk Cargoes Code and supplement 2009 Edition (IMSBC Code).

⁹ IMO Circular MEPC.1/Circ.469/Rev.1, Revised Consolidated Format for Reporting Alleged Inadequacy of Port Reception Facilities.

4.2 Governments may exchange and maintain information relevant to compliance, non-compliance and information on legal proceedings for violations with Annex V regulations through the Organization. Governments are encouraged to provide the Organization with the following:

- .1 technical information on shipboard garbage management methods such as minimization, recovery, recycling, reuse, incineration, compaction, separation, sorting and sanitation system, packaging and provisioning methods;
- .2 educational materials developed to raise the level of compliance with Annex V. This includes printed materials (e.g. placards, posters, brochures, etc.), photographs, DVDs, audio and video tapes, and films as well as synopses of training programmes, seminars and formal curricula; and
- .3 information and reports on the nature and extent of garbage from shipping found along beaches and in coastal waters under their respective jurisdictions. In order to assess the effectiveness of Annex V, these studies should provide details on amounts, distribution, sources and impacts of garbage from shipping.

4.3 Governments are encouraged to amend their maritime certification examinations and requirements, as appropriate, to include a knowledge of duties imposed by national and international law regarding the control of pollution of the sea by garbage.

4.4 Placards required by regulation 10.1 should contain a summary declaration stating the prohibition and restrictions for discharging garbage from ships under MARPOL Annex V and the possible penalties for failure to comply. Governments are encouraged to develop appropriate placards for use by every ship of their registry of more than 12 metres in length overall and fixed and floating platforms. (Sample placards targeting crew and shipboard operations; fixed or floating platforms and ships operating within 500 metres of such platforms; and passengers are shown in figures 1, 2 and 3.)

4.4.1 The declaration should be placed on a placard at least 12.5 cm by 20 cm, made of durable material and fixed in conspicuous and prominent places on board the ship. Placards should also be replaced when damage or wear compromises the readability of the declaration.

4.4.2 The placards should also be placed in prominent places where crew will be working and living, and in areas where bins are placed for collection of garbage. These places include galley spaces, mess room(s), wardroom, bridge, main deck and other areas of the ship, as appropriate. The placards should be displayed at line of sight height and be printed in the working language of the crew. Ships which operate internationally will also have placards printed in English, French or Spanish, in accordance with regulation 10.1.2 of MARPOL Annex V.

4.4.3 Where the ship carries passengers, placards also should be placed in prominent places where passengers are accommodated and congregate. These include cabins, all deck areas for recreational purposes open to passengers.

4.5 Governments should ensure that appropriate education and training in respect of MARPOL is included in the training programmes leading to STCW and STCW-F certification.

4.6 Governments are encouraged to have maritime colleges and technical institutes under their jurisdiction develop or augment curricula to include both the legal duties as well as the technical options available to professional seafarers for handling ship-generated garbage. These curricula should also include information on environmental and ecological impacts of garbage. A list of suggested topics to be included in the curriculum is provided below:

- .1 garbage in the marine environment, sources, methods for prevention of release of garbage to the environment and impacts on the environment;
- .2 national and international laws relating to, or impinging upon shipboard waste management;
- .3 health and sanitation considerations related to the storage, handling and transfer of ship-generated garbage;
- .4 current technology for onboard and shoreside¹⁰ processing of ship generated garbage; and
- .5 provisioning options, materials and procedures to minimize the generation of garbage aboard ships.

4.7 Professional associations and societies of ship officers, engineers, naval architects, shipowners and managers, and seafarers are encouraged to ensure their members' competency regarding the handling of ship-generated garbage.

4.8 Ship and reception facility operators should establish detailed training programmes for personnel operating and maintaining ships garbage reception or processing equipment. It is suggested that the programme include instruction on what constitutes garbage and the applicable regulation for handling and disposing of it. Such training should be reviewed annually and updated as appropriate.

4.9 Generalized public information programmes are needed to provide information to non-professional seafarers, and others concerned with the health and stability of the marine environment, regarding the impacts of garbage at sea. Governments and involved commercial organizations are encouraged to utilize the Organization's library and to exchange resources and materials, as appropriate, to initiate internal and external public awareness programmes.

4.9.1 Methods for delivering this information include radio and television, articles in periodicals and trade journals, voluntary public projects such as beach clean-up days and adopt-a-beach programmes, public statements by high government officials, posters, brochures, social media, conferences and symposia, cooperative research and development, voluntary product labelling and teaching materials for public schools.

4.9.2 Audiences include recreational sailors and fishermen, port and terminal operators, coastal communities, ship supply industries, shipbuilders, garbage management industries, plastic manufacturers and fabricators, trade associations, educators and governments.

¹⁰ Reference may also be made to other technical guidance such as, ISO/CD16304 Ships and marine technology – Marine environment protection – Arrangement and management of port waste reception facilities.

4.9.3 The subjects addressed in these programmes are recommended to include the relevant domestic and international law; options for handling garbage at sea and upon return to shore; known sources and types of garbage; impacts of plastics on marine life and ship operations; the accumulation of garbage in the world's oceans and seas impacts on coastal tourist trade; current actions by governments, intergovernmental organizations, non-governmental organizations and sources of further information.

5 PORT RECEPTION FACILITIES FOR GARBAGE

5.1 The methodology for determining the adequacy of a reception facility should be based on the number and types of ships that will call at the port, the waste management requirements of each type of ship as well as the size and location of a port. Emphasis should also be placed on calculating the quantities of garbage, including recyclable material from ships which are not discharged into the sea in accordance with the provisions of Annex V.

5.2 It should be noted that, due to differences in port reception procedures and additional treatment among ports, port reception facilities may require the separation on board of:

- .1 food wastes (e.g. animal derived products and by-products because of risk of animal diseases);
- .2 cooking oil (animal derived products and by-products because of risk of animal diseases);
- .3 plastics;
- .4 domestic waste, operational waste and recyclable or reusable material;
- .5 special items like medical waste, outdated pyrotechnics and fumigation remnants;
- .6 animal wastes, including used bedding from the transport of live animals (due to risk of disease) but excluding drainage from spaces containing living animals; and
- .7 cargo residues.

5.3 Ship, port and terminal operators should consider the following when determining quantities and types of garbage on a per ship basis:

- .1 types of garbage normally generated;
- .2 ship type and design;
- .3 ship operating route;
- .4 number of persons on board;
- .5 duration of voyage;
- .6 time spent in areas where discharge into the sea is prohibited or restricted; and
- .7 time spent in port.

5.4 Governments, in assessing the adequacy of reception facilities, should also consider the technological challenges associated with the recycling, treatment and discharge of garbage received from ships. Governments should take responsible actions within their national programmes to consider garbage management standards. In doing so, relevant international standards should be taken into account.

5.4.1 The type and capacity of equipment for treatment and final disposal of garbage is a significant factor in determining the adequacy of a reception facility. It not only provides a measure of the time required to complete the process, but it also is the primary means for ensuring that ultimate disposal of the garbage is environmentally sound.

5.4.2 Governments should continue to carry out studies into the provision of reception facilities at ports in their respective countries. Governments should carry out the studies in close cooperation with port authorities and other local authorities responsible for garbage handling. Such studies should include information such as a port-by-port listing of available garbage reception facilities, the types of garbage they are equipped to handle their capacities and any special procedures required to use them. Governments should submit data on the availability of port reception facilities to GISIS.

5.4.3 While selecting the most appropriate type of reception facility for a particular port, consideration should be given to several alternative methods available. In this regard, floating plants for collection of garbage, such as barges or self-propelled ships, might be considered more effective in a particular location than land-based facilities.

5.5 These guidelines aim to stimulate governments to develop modern waste reception facilities and continue to improve their garbage management processes. Information on developments in this area should be forwarded to the Organization.

5.6 Governments are encouraged to develop policies and practices that facilitate the reduction, use and recycling of ship-generated garbage. The development of port reception facilities and associated guidance that aids the handling of separated garbage from ships should encourage ships to separate garbage on board.

6 ENHANCEMENT OF COMPLIANCE WITH MARPOL ANNEX V

6.1 Recognizing that direct enforcement of Annex V regulations, particularly at sea, is difficult to accomplish, governments are encouraged to consider not only restrictive and punitive measures consistent with international law, but also the removal of any disincentives, the creation of positive incentives and initiatives to facilitate more effective compliance, and the development of voluntary measures within the regulated community when developing programmes and domestic legislation to ensure compliance with Annex V.

6.2 Compliance Facilitation and Enforcement

6.2.1 Ships should inform their flag State of ports in foreign countries Party to Annex V which do not have adequate port reception facilities for garbage. This can provide a basis for advising responsible governments of possible problems and calling the Organization's attention to possible issues of compliance. An acceptable reporting format is reproduced in MEPC.1/Circ.671, along with the procedure for submitting and handling such reports.

6.2.2 Governments should develop a strategy to assess or audit port reception facilities under their jurisdiction. Detailed guidance in this regard is provided by the Organization. At a minimum, periodic inspection of the reception facilities is recommended and consideration should be given to establishing a documentation system (e.g. letters or certificates) stating that adequate facilities are available for receiving ship-generated garbage.

6.2.2.1 Governments are encouraged to improve the adequacy and efficiency of existing port reception facilities for fishing gear.

6.2.3 Governments should identify appropriate agencies for enforcement and facilitating compliance and provide legal authority, adequate training, funding and equipment to incorporate the goals and objectives under Annex V regulations into their responsibilities. In those cases where customs or agricultural officials are responsible for receiving and inspecting garbage, governments should ensure that the inspections are facilitated.

6.2.4 Governments should consider the use of garbage management reporting systems. Such reporting systems may provide valuable data for measuring and monitoring the impacts of garbage regulations and management and identifying trends over time. A reporting system could be based on the information in garbage record books (where applicable) or ship's log. In addition advance notification forms and garbage reception receipts could provide input into the garbage reporting system.

6.2.5 A garbage management reporting system may also include reporting of discharges of garbage. Particular attention should be given to the reporting of any discharge in special areas; discharge at port reception facilities; and discharge of garbage into the sea. Reports should include the date, time, location by latitude and longitude, or name of port, type of garbage and estimated amount of garbage discharged. Particular attention should be given to the reporting of:

- .1 the loss of fishing gear;
- .2 the discharge of cargo residues;
- .3 any discharge in special areas;
- .4 discharge at port reception facilities; and
- .5 discharge of garbage into the sea, in those limited situations, where permitted.

6.2.6 The issuance of documents or receipts (i.e. IMO standard forms) by port reception facilities might also be used in maintaining a garbage management reporting system.

6.3 Compliance incentive systems

6.3.1 The augmentation of port reception facilities to serve ship traffic without undue delay or inconvenience may call for capital investment from port and terminal operators as well as the garbage management companies serving those ports. Governments are encouraged to evaluate means within their authority to lessen this impact, thereby helping to ensure that garbage delivered to port is actually received and disposed of properly at reasonable cost or without charging special fees to individual ships. Such means could include, but are not limited to:

- .1 tax incentives;
- .2 loan guarantees;
- .3 public vessel business preference;
- .4 special funds to assist in problem situations such as remote ports with no land-based garbage management system in which to deliver ships' garbage;
- .5 government subsidies; and
- .6 special funds to help defray the cost of a bounty programme for lost, abandoned or discarded fishing gear or other persistent garbage. The programme would make appropriate payments to persons who retrieve such fishing gear, or other persistent garbage other than their own, from marine waters under the jurisdiction of government.

6.3.2 The minimization of taking packaging on board and the installation of shipboard garbage management handling and processing equipment would facilitate compliance with Annex V and lessen the burden on port reception facilities to process garbage for discharge. Therefore, governments might consider actions to encourage the reduction of packaging and the installation of certain types of garbage processing equipment on ships operating under its flag. For example, programmes to lessen costs to shipowners for purchasing and installing such equipment, or requirements for installing compactors, incinerators and comminuters during construction of new ships could be very helpful.

6.3.3 Governments are encouraged to consider the economic impacts of domestic regulations intended to ensure compliance with Annex V. Due to the highly variable nature of ship operations and configurations, consideration should be given in domestic regulations to permitting ships the greatest range of options for complying with Annex V. However, any range of options needs to be consistent with Annex V and should facilitate the implementation of and compliance with Annex V.

6.3.4 Governments are encouraged to support research and development of technology that facilitates compliance with Annex V regulations for ships and ports. This research should concentrate on:

- .1 minimization of packaging;
- .2 shipboard garbage handling systems;
- .3 ship provision innovations to minimize garbage generation;
- .4 loading, unloading and cleaning technologies to minimize dunnage, spillage and cargo residues;
- .5 new ship construction design to facilitate garbage management and transfer and to minimize retention of cargo in ship holds; and
- .6 wharf and berth design to facilitate garbage management and transfer.

6.3.5 Governments are encouraged to work within the Organization to develop port reception systems that simplify the transfer of garbage for international vessels.

6.4 Voluntary measures

6.4.1 Governments are encouraged to assist ship operators and seafarers' organizations in developing resolutions, by-laws and other internal mechanisms that encourage compliance with Annex V regulations. Some of these groups include:

- .1 seamen and officer unions;
- .2 associations of shipowners, insurers, classification societies;
- .3 pilot associations; and
- .4 fishermen's organizations.

6.4.2 Governments are encouraged to assist and support, where possible, the development of mechanisms to promote compliance with Annex V among port authorities, terminal operators, stevedores, longshoremen, and land-based garbage management authorities.

Sample placard targeting crew and shipboard operations

Discharge of all garbage into the sea is prohibited except provided otherwise

The MARPOL Convention and domestic law prohibit the discharge of most garbage from ships. Only the following garbage types are allowed to be discharged and under the specified conditions.

Outside Special Areas designated under MARPOL Annex V:

- Comminuted or ground food wastes (capable of passing through a screen with openings no larger than 25 millimetres) may be discharged not less than 3 nautical miles from the nearest land.
- Other food wastes may be discharged not less than 12 nautical miles from the nearest land.
- Cargo residues classified as not harmful to the marine environment may be discharged not less than 12 nautical miles from the nearest land.
- Cleaning agents or additives in cargo hold, deck and external surfaces washing water may be discharged only if they are not harmful to the marine environment.
- With the exception of discharging cleaning agents in washing water, the ship must be en route and as far as practicable from the nearest land.

Inside Special Areas designated under MARPOL Annex V

- More stringent discharge requirements apply for the discharges of food wastes and cargo residues; AND
- Consult Annex V and the shipboard garbage management plan for details.

For all areas of the sea, ships carrying specialized cargoes such as live animals or solid bulk cargoes should consult Annex V and the associated Guidelines for the implementation of Annex V.

Discharge of any type of garbage must be entered in the Garbage Record Book
Violation of these requirements may result in penalties.

Sample placard targeting fixed or floating platforms and ships operating within 500 metres of such platforms

Discharge of all garbage into the sea is prohibited except provided otherwise

The MARPOL Convention and domestic law prohibit the discharge of all garbage into the sea from fixed or floating platforms and from all other ships when alongside or within 500 metres of such platforms.

Exception: Comminuted or ground food wastes may be discharge from fixed or floating platforms located more than 12 miles from the nearest land and from all other ships when alongside or within 500 metres of such platforms. Comminuted or ground food wastes must be capable of passing through a screen no larger than 25 millimetres.

Discharge of any type of garbage must be entered in the Garbage Record Book

Violation of these requirements may result in penalties.

Sample placard targeting passengers

Discharge of all garbage into the sea is prohibited except provided otherwise

The MARPOL Convention and domestic law generally prohibit the discharge of most forms of garbage from ships into the sea.

Violation of these requirements may result in penalties.

All garbage is to be retained on board and placed in the bins provided.

ANNEX 25

RESOLUTION MEPC.220(63)
Adopted on 2 March 2012**2012 GUIDELINES FOR THE DEVELOPMENT OF
GARBAGE MANAGEMENT PLANS**

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 the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto provides regulations for the prevention of pollution by garbage from ships,

NOTING that the Committee, at its thirty-eighth session, adopted the Guidelines for the Development of Garbage Management Plans by resolution MEPC.71(38),

NOTING ALSO that the Committee, at its sixty-second session, adopted the revised MARPOL Annex V by resolution MEPC.201(62), which is expected to enter into force on 1 January 2013,

NOTING FURTHER that regulation 10.2 of the revised MARPOL Annex V provides that every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons and fixed or floating platforms shall carry a Garbage Management Plan based on the guidelines developed by the Organization,

RECOGNIZING the need to review the Guidelines for the Development of Garbage Management Plans, in light of the revised MARPOL Annex V,

HAVING CONSIDERED, at its sixty-third session, the draft 2012 Guidelines for the Development of Garbage Management Plans,

1. ADOPTS the 2012 Guidelines for the Development of Garbage Management Plans, the text of which is set out in the annex to this resolution;
2. INVITES Governments to apply the 2012 Guidelines for the Development of Garbage Management Plans, upon the entry into force of the revised MARPOL Annex V; and
3. REVOKES the Guidelines for the Development of Garbage Management Plans (resolution MEPC.71(38)), upon the entry into force of the revised MARPOL Annex V.

ANNEX

2012 GUIDELINES FOR THE DEVELOPMENT OF GARBAGE MANAGEMENT PLANS

For compliance with regulation 10 of the revised MARPOL Annex V

1 INTRODUCTION

1.1 In 2011, IMO adopted amendments to MARPOL Annex V which require that:

- .1 every ship of 100 gross tonnage and above, and every ship certified to carry 15 or more persons, and fixed or floating platforms shall carry a garbage management plan;
- .2 every ship of 400 gross tonnage and above, and every ship certified to carry 15 or more persons engaged in voyages to ports or offshore terminals of another Party, and every fixed or floating platform shall be provided with a Garbage Record Book; and
- .3 every ship of 12 metres or more in length overall, and fixed or floating platforms shall display placards which notify the crew and passengers of the ship's disposal requirements of regulations 3, 4, 5 and 6 of the Annex as applicable.

These provisions are included in regulation 10 to the revised MARPOL Annex V with an entry into force date of 1 January 2013.

1.2 These Guidelines provide direction on complying with the requirements for a ship's garbage management plan, and are intended to assist the shipowner/operator in the implementation of regulation 10.2 of the revised MARPOL Annex V. It is assumed that the author of the garbage management plan is familiar with the requirements of the revised MARPOL Annex V and the IMO Guidelines for the Implementation of MARPOL Annex V.

1.3 Shipowners and operators should also consult other available technical guidance on shipboard garbage handling such as, ISO 21070 "Standard for the Management and handling of shipboard garbage" which outlines best management practices for shipboard garbage management and, to the extent it is consistent with the revised MARPOL Annex V, should be incorporated in any garbage management plan.

1.4 A ship's garbage management plan should detail the specific ship's equipment, arrangements and procedures for the handling of garbage. The plan may contain extracts and/or references to existing company instructions.

2 REGULATORY REQUIREMENTS

2.1 Regulation 10.2 of MARPOL Annex V reads as follows:

"Every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons, and fixed or floating platforms, shall carry a garbage management plan which the crew shall follow. This plan shall provide written procedures for minimizing, collecting, storing, processing and disposing of garbage, including the use of the equipment on board. It shall also designate the person or

persons in charge of carrying out the plan. Such a plan shall be based on the guidelines developed by the Organization and written in the working language of the crew."

3 PREVENTION OF POLLUTION FROM GARBAGE

3.1 To achieve cost-effective and environmentally sound results, many garbage management planners use a combination of complementary techniques to manage garbage, such as the following:

- .1 reduction at source;
- .2 reusing or recycling;
- .3 onboard processing (treatment);
- .4 discharge into the sea in those limited situations where it is permitted; and
- .5 discharge to a port reception facility.

3.2 When requisitioning stores and provisions, shipping companies should encourage their suppliers to remove, reduce, all packaging, at an early stage, to limit the generation of garbage on board ships.

3.3 When garbage is generated aboard a ship, procedures should be defined to enable the crew to sort the material that can be reused onboard the ship or recycled at an appropriate port reception facility.

3.4 Ship's garbage is made up of distinct components, some of which are regulated in MARPOL Annex V, while others may be regulated locally, nationally or regionally. Each component of the garbage should be evaluated separately to determine the best management practice for that type of garbage.

4 MATTERS WHICH SHOULD BE ADDRESSED IN THE GARBAGE MANAGEMENT PLAN

4.1 Designated person in charge of carrying out the plan

4.1.1 In accordance with regulation 10.2 of the revised MARPOL Annex V, the plan shall designate a person in charge of carrying out the plan. The person should ensure the garbage management plan is followed.

4.1.2 This person should be assisted by ship's crew to ensure that the minimization, collection, separation and processing of garbage is appropriate and efficient in all areas of the ship.

4.2 Procedures for collecting garbage

4.2.1 Identify suitable receptacles for collection and separation¹.

¹ Separation of garbage for the purposes of these Guidelines is considered part of the collection process. Separation may take place at the source or at a separate designated station.

- 4.2.2 Identify the locations of receptacles and collection and separation stations.
- 4.2.3 Describe the process of how garbage is transported from the source of generation to the collection and separation stations.
- 4.2.4 Describe how garbage is to be handled between primary collection and separation stations and other handling methods relating to the following:
- .1 needs of reception facilities, taking into account possible local recycling arrangements;
 - .2 onboard processing and potential reuse of garbage aboard the ship;
 - .3 storage; and
 - .4 discharge into the sea in those limited situations where it is permitted.
- 4.2.5 Describe the training or education programmes to facilitate collection of garbage and sorting of reusable or recyclable material.

4.3 Procedures for processing garbage

- 4.3.1 Identify personnel responsible for the operation of the processing equipment.
- 4.3.2 Identify available processing devices and their capacities.
- 4.3.3 Identify the locations of processing devices and processing stations.
- 4.3.4 Identify the categories of garbage that are to be processed by each of the available processing devices.
- 4.3.5 Describe how material that can be reused or recycled is to be handled between primary processing stations and the storage or transfer stations.
- 4.3.6 Describe processing procedures used for the following:
- .1 needs of reception facilities, taking into account available recycling arrangements;
 - .2 storage; and
 - .3 discharge into the sea in those limited situations where it is permitted.
- 4.3.7 Describe the training or education programmes to facilitate the processing of garbage and reuse or recycling of material.
- 4.3.8 Identify standard operating procedures for the operation and maintenance of the equipment used to manage garbage. This may be done by reference to documents available on board.

4.4 Procedures for storing garbage or reusable or recyclable material

4.4.1 Identify the locations, the intended use, and the capacities of available storage stations for each category of garbage or reusable or recyclable material.

4.4.2 Describe the condition of how the garbage will be stored (for example, "food – frozen"; "cans – compacted and stacked"; "paper – compacted and should remain dry", etc.).

4.4.3 Describe how garbage, including reusable and recyclable material, is to be handled between storage stations and discharge with regard to the following:

- .1 discharge to reception facilities, taking into account available recycling arrangements; and
- .2 discharge into the sea in those limited situations where it is allowed.

4.4.4 Describe the training or education programmes to facilitate the storing of garbage and options for reusing and recycling components of the waste stream.

4.5 Procedures for discharging of garbage

4.5.1 Describe the ship's procedures to ensure and demonstrate compliance with the requirements of the revised MARPOL Annex V for the discharge of garbage.

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MEPC.1/Circ.810
27 June 2013

IMPLEMENTATION OF MARPOL ANNEX V

Adequate port reception facilities for cargoes declared as harmful to the marine environment under MARPOL Annex V

1 The Marine Environment Protection Committee (the Committee), at its sixty-fourth session (1 to 5 October 2012), noting the short time between publishing criteria for solid bulk cargoes considered harmful to the marine environment (HME) under the revised MARPOL Annex V and the entry into force of the Annex (on 1 January 2013), and recognizing the difficulties this would cause for shippers to classify cargoes, agreed to issue circular MEPC.1/Circ.791 on Provisional classification of solid bulk cargoes under the revised MARPOL Annex V between 1 January 2013 and 31 December 2014.

2 At its sixty-fifth session (13 to 17 May 2013), the Committee acknowledged that, as a result of the difficulties experienced by shippers, consequential problems are being experienced by shipowners and operators in obtaining HME declarations and, when cargoes have been classified as HME, finding adequate reception facilities at receiving terminals.

3 In light of the above, the Committee agreed that, until 31 December 2015, cargo hold washwater from holds previously containing solid bulk cargoes classified as HME may be discharged outside special areas, providing:

- .1 based upon the information received from the relevant port authorities, the master determines that there are no adequate reception facilities either at the receiving terminal or at the next port of call;
- .2 the ship is en route and as far as practicable from the nearest land, but not less than 12 nautical miles;
- .3 before washing, solid bulk cargo residue is removed (and bagged for discharge ashore) as far as practicable and holds are swept;
- .4 filters are used in the bilge wells to collect any remaining solid particles and minimize solid residue discharge; and
- .5 the discharge is recorded in the Garbage Record Book and the flag State is notified utilizing the Revised Consolidated Format for Reporting Alleged Inadequacies of Port Reception Facilities (MEPC.1/Circ.469/Rev.2).



- 4 In addition, the Committee urged Parties to MARPOL Annex V to:
- .1 ensure the provision of adequate facilities at ports and terminals for the reception of solid bulk cargo residues including those contained in washwater;
 - .2 ensure shippers within their jurisdiction provide complete and accurate cargo declarations in accordance with MARPOL Annex V (and circular MEPC.1/Circ.791) and section 4 of the IMSBC Code; and
 - .3 notify the Organization for transmission to the Parties concerned of all cases where the facilities are alleged to be inadequate.

5 Further, ports and terminals receiving cargoes classified as HME are urged to provide adequate port reception facilities, including for residues contained in washwater. In the absence of such facilities, to minimize residues discharged under paragraph 3, terminals should facilitate the discharge of all solid bulk cargo residues ashore, including hold sweepings.

6 Member Governments are invited to bring the content of this circular to the attention of those interested, including port State control authorities, coastguard and maritime surveillance services, as appropriate.

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GESAMP Hazard Profiles

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EHS Name TRN Name	EHS TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Acetic acid	13	0	0	0	R	1	NI	1	1	1	3C	3			D	3
Acetic acid	64	RTECS No			AF1225000	CAS No			64-19-7							
Acetic anhydride	12	0	0	0	R	1	NI	1	0	2	3	3	A		D	3
Acetic anhydride	65	RTECS No			AK1925000	CAS No			108-24-7							
Acetochlor (ISO)	2047	3	2	2	NR	4	NI	1	0	(1)	0	0			S	2
Acetochlor	66	RTECS No			AB5457000	CAS No			34256-82-1							
Acetone	15	0	0	0	R	0	0	0	0	0	1	2		NT	DE	2
Acetone	67	RTECS No			AL3150000	CAS No			67-64-1							
Acetone cyanohydrin	14	0	0	0	R	4	NI	3	4	3	(3)	(3)			D	3
Acetone cyanohydrin	68	RTECS No			OD9275000	CAS No			75-86-5							
Acetonitrile	16	0	0	0	R	1	NI	1	1	2	1	2			D	2
Acetonitrile	69	RTECS No			AL7700000	CAS No			75-05-8							
Acetonitrile (Low purity grade)	2333	0	NI	0	R	3	NI	1	1	2	1	2			D	2
Acetonitrile (Low purity grade)	2876	RTECS No			CAS No											
Acid mixtures (nitrating acid)	289	Inorg	NI	0	Inorg	(2)	NI	3	3	4	3C	3			D	3
Nitrating acid (mixture of sulphuric and nitric acids)	497	RTECS No			CAS No											
Acrylamide	23	0	0	0	R	2	0	2	2	(2)	1	2	CMNS		D	3
Acrylamide solution (50% or less)	70	RTECS No			AS3325000	CAS No			79-06-1							
Acrylic acid	24	0	0	0	R	4	NI	2	2	2	3C	3			D	3
Acrylic acid	71	RTECS No			AS4375000	CAS No			79-10-7							
Acrylic acid / dimethyldiallylammonium chloride copolymer, partial sodium salt (MWt 1500-4000, aqueous solution)	2406	0	NI	0	R	0	0	0	0	(0)	0	0			D	0
Acrylic acid / dimethyldiallylammonium chloride copolymer, partial sodium salt (MWt 1500-4000, aqueous solution)	3682	RTECS No			CAS No											
Acrylic acid/ethenesulfonic acid copolymer with phosphonate groups, sodium salt (aqueous solution)	2417	0	NI	0	NR	0	NI	0	(0)	(0)	0	0			D	0
Acrylic acid / ethenesulfonic acid copolymer with phosphonate groups, sodium salt solution	3693	RTECS No			CAS No											
Acrylonitrile	25	0	2	2	NR	3	0	2	3	3	2	2	CSM	NT	DE	3
Acrylonitrile	72	RTECS No			AT5250000	CAS No			107-13-1							
Acrylonitrile-styrene copolymer dispersion in polyether polyol (LOA)	1432	NI	0	0	NI	1	NI	0	(0)	(0)	0	(0)			S	0
Acrylonitrile-Styrene copolymer dispersion in polyether polyol	73	RTECS No			CAS No											
Adiponitrile	26	0	0	0	R	1	NI	3	(3)	3	3	(3)			FD	3

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EHS Name TRN Name	EHS TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Adiponitrile	74	RTECS No			AV2625000	CAS No			111-69-3							
Alachlor (ISO)	1488	3	3	3	NI	4	1	1	0	(2)	1	0	CS		S	3
Alachlor technical (90% or more)	75	RTECS No			AE1225000	CAS No			15972-60-8							
Alcoholic beverages	293	0	0	0	R	0	0	0	0	0	0	1			D	1
Alcoholic beverages, n.o.s.	85	RTECS No			CAS No											
Alcoholic silicasol	2198	0	0	0	R	0	0	0	0	0	1	2			DE	2
Tetraethyl silicate monomer/oligomer (20% in ethanol)	2475	RTECS No			CAS No											
Alcohol(C12-C16) poly(20 and above)ethoxylates	1482	4	(3)	(3)	R	2	0	(0)	(0)	(2)	2	1			D	2
Alcohol (C12-C16) poly(20+)ethoxylates	78	RTECS No			CAS No											
Alcohol(C6-C17)(secondary) poly(3-6)ethoxylate	722	4	3	3	R	4	2	0	(0)	(3)	3	2			D	3
Alcohol (C6-C17) (secondary) poly(3-6)ethoxylates	81	RTECS No			CAS No											
Alcohol(C6-C17)(secondary) poly(7-12)ethoxylate	295	3	3	3	R	4	1	1	0	(3)	3	3			D	3
Alcohol (C6-C17) (secondary) poly(7-12)ethoxylates	80	RTECS No			CAS No											
Alcohol(C8-C11) poly(2.5-9)ethoxylates	2094	3	3	3	R	3	NI	1	0	(2)	(2)	(2)			D	2
Alcohol (C9-C11) poly (2.5-9) ethoxylate	2209	RTECS No			CAS No											
Alcohol(C12-C16) poly(1-6)ethoxylates	294	5	3	3	R	4	1	0	0	(2)	2	2			FD	2
Alcohol (C12-C16) poly(1-6)ethoxylates	77	RTECS No			CAS No											
Alcohol(C12-C16) poly(7-19)ethoxylates	1481	4	3	3	R	4	1	1	0	(3)	3	3			D	3
Alcohol (C12-C16) poly(7-19)ethoxylates	79	RTECS No			CAS No											
Alcohol(C12 - C14)poly(2)ethoxylate sulfate, sodium salt (*)	2419	2	NI	2	R	3	NI	NI	NI	NI	NI	NI			NI	NI
	3695	RTECS No			CAS No											
Alcohols (C8-C11)	2279	5	2	2	(R)	(3)	(1)	(0)	(0)	(2)	(2)	(2)			Fp	2
Alcohols (C8-C11), primary, linear and essentially linear	2887	RTECS No			CAS No											
Alcohols, C13 and above as individuals and mixtures	2039	5	2	2	R	4	1	0	0	0	(1)	(1)			Fp	2
Alcohols (C13+)	86	RTECS No			CAS No											
Alcohols, C10-C16 ethoxylated propoxylated (*)	2450	0	NI	0	R	3	NI	NI	NI	NI	NI	NI			NI	NI
	3868	RTECS No			CAS No											
Alcohols (C12-C13), linear	2294	5	2	2	R	4	(1)	0	0	(1)	1	1			Fp	2
Alcohols (C12-C13), primary, linear and essentially linear	2950	RTECS No			CAS No											
Alcohols (C14-C18), linear	2293	5	2	2	R	0	1	0	0	(1)	1	1			Fp	2

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Alcohols (C14-C18), primary, linear and essentially linear	2951	RTECS No			CAS No												
Alcohols, linear (C10-C14)	2365	(5)	(2)	(2)	(R)	(4)	(1)	0	0	(2)	(2)	(2)			Fp	2	
Decyl/Dodecyl/Tetradecyl alcohol mixture	3128	RTECS No			CAS No												
Alkanes (C6-C9)	2202	(5)	NI	(5)	(R)	(4)	NI	(0)	(0)	(1)	(2)	(2)	N		FE	2	
Alkanes (C6-C9)	88	RTECS No			CAS No												
Iso- and cyclo-alkanes (C10-C11)	2203	(5)	NI	(5)	NI	(0)	(0)	(0)	(0)	(1)	(1)	(0)			F	1	
Iso- and cyclo-alkanes (C10-C11)	393	RTECS No			CAS No												
Iso-and cyclo-alkanes (C12+)	2204	(5)	NI	(5)	NI	(0)	NI	0	0	(1)	NI	NI			NI	1	
Iso- and cyclo-alkanes (C12+)	394	RTECS No			CAS No												
Alkanes(C10 -C26), linear and branched	2392	0	NI	0	R	0	NI	0	0	(1)	1	1	A		F	3	
Alkanes(C10-C26), linear and branched, (flashpoint >60°C)	3562	RTECS No			CAS No			90622-53-0									
n-Alkanes (C9-C11)	2449	(5)	NI	(5)	R	0	(0)	0	0	(2)	2	0	A		F	3	
n-Alkanes (C10-C20)	296	(5)	NI	(5)	(R)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	A		F	3	
n-Alkanes (C10+)	471	RTECS No			CAS No												
Alkane (C14-C17) sulphonic acid, sodium salt	334	2	2	2	R	3	1	0	0	(2)	2	2			D	2	
Sodium alkyl (C14-C17) sulphonates (60-65% solution)	1153	RTECS No			CAS No												
Alkaryl polyether (C9-C20) (LOA)	1974	4	NI	4	NR	3	NI	0	0	(3)	2	3			S	2	
Alkaryl polyethers (C9-C20)	90	RTECS No			CAS No												
Alkenoic acid ester, borated	2376	5	(3)	(3)	R	2	NI	0	0	(2)	2	0			Fp	2	
Alkenylamide, long chain, more than C10	1858	3	NI	3	(NR)	4	NI	0	(0)	(1)	0	1			Fp	2	
Alkenyl (C11+) amide	838	RTECS No			CAS No												
Alkenyl succinic anhydride	298	0	0	0	NR	1	NI	0	0	(2)	2	(2)	S		FD	2	
Alkenyl (C16-C20) succinic anhydride	2336	RTECS No			CAS No												
Alkyl acrylate/Vinyl pyridine copolymer in toluene	299	2	2	2	R	2	0	0	0	(2)	2	2	RNA		F/Fp	3	
Alkyl acrylate-vinylpyridine copolymer in toluene	94	RTECS No			CAS No												
Alkyl amine, alkenyl acid ester, mixture	1433	NI	NI	NI	NI	1	NI	(0)	(0)	NI	NI	NI	S		Fp	3	
Alkyl(C8+)amine, Alkenyl (C12+) acid ester mixture	98	RTECS No			CAS No												
Alkylaryl phosphate mixtures (more than 40% Diphenyl tolyl phosphate, less than 0.02% ortho-isomers)	2267	4	4	4	R	4	4	0	0	(1)	1	0			S	1	

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Alkylaryl phosphate mixtures (more than 40% Diphenyl tolyl phosphate, less than 0.02% ortho-isomers)	280	RTECS No			CAS No												
Alkylated phenols (C4-C9)	2273	0	2	0	NR	1	0	1	0	(2)	1	1			Fp	2	
Alkylated (C4-C9) hindered phenols	2575	RTECS No			CAS No												
Alkyl benzene distillation bottoms	300	0	2	2	NR	0	(3)	0	0	1	1	1			Fp	2	
Alkyl benzene distillation bottoms	3106	RTECS No			CAS No												
Alkyl (C12-C15) benzene/indane/indene mixture	1872	0	4	4	NR	0	NI	0	0	0	0	2			FE	2	
Alkylbenzene, alkyindane, alkyindene mixture (each C12-C17)	103	RTECS No			CAS No												
Alkylbenzene mixtures (containing at least 50% of toluene)	2303	(2)	(2)	(2)	(R)	(3)	(0)	0	0	(2)	2	2	ACMNR		FE	3	
Alkylbenzene mixtures (containing at least 50% of toluene)	2909	RTECS No			CAS No												
Alkyl (C3-C4) benzenes	2206	(3)	NI	(3)	R	4	NI	0	0	(2)	(2)	(1)			FE	2	
Alkyl (C3-C4) benzenes	91	RTECS No			CAS No												
Alkyl (C5-C8) benzenes	2207	5	4	4	(NR)	4	NI	0	0	(2)	(2)	(1)			F	2	
Alkyl (C5-C8) benzenes	92	RTECS No			CAS No												
Alkyl benzenes, C9-C17 (straight or branched)	1783	0	4	4	NR	1	NI	0	(0)	(1)	(1)	(1)			F	1	
Alkyl(C9+)benzenes	100	RTECS No			CAS No												
Alkylbenzenes mixture (containing less than 1% naphthalene)	2423	3	3	3	NR	4	NI	0	0	(2)	2	1	AC		F	3	
Alkylbenzenes mixture (containing less than 1% naphthalene)	3600	RTECS No			CAS No												
Alkylbenzenes mixtures (containing naphthalene)	2424	(3)	(3)	(3)	(NR)	(4)	NI	0	0	(1)	1	1	AC		F	3	
Alkylbenzenes mixture (containing naphthalene)	3698	RTECS No			CAS No												
Alkyl(C11-C13)benzenesulphonates, straight chain	301	3	3	3	R	3	1	1	(1)	(3)	2	3			FD	3	
Alkylbenzene sulphonic acid, sodium salt solution	102	RTECS No			CAS No			DB4370000 42615-29-2									
Alkyl dithiocarbamate (C19-C35)	2236	0	NI	0	NI	1	NI	0	0	(0)	0	0			S	0	
Alkyl dithiocarbamate (C19-C35)	2538	RTECS No			CAS No												
Alkyl dithio thiazole (C6-C24) (LOA)	1981	5	NI	5	NR	1	NI	0	0	(0)	0	0			S	2	
Alkyl dithiothiazole (C6-C24)	104	RTECS No			CAS No												
Alkyl(C4-C20) ester copolymer (LOA)	1986	NI	0	0	NR	0	NI	0	0	(0)	0	0			Fp	2	
Alkyl ester copolymer (C4-C20)	2202	RTECS No			CAS No												
Alkyl naphthalenes, crude (containing less than 1% naphthalene)	2425	4	4	4	R	4	NI	0	0	(1)	1	1	AC		F	3	
Alkyl naphthalenes (containing less than 1% naphthalene), crude	3601	RTECS No			CAS No												
Alkyl naphthalenes, crude (containing naphthalene)	2426	(4)	(4)	(4)	(R)	(4)	NI	0	0	(1)	1	1	AC		F	3	

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Alkyl naphthalenes (containing naphthalenes), crude	3699															
Alkyl (C7-C9) nitrates	8	4	NI	4	NR	3	NI	0	0	(3)	2	(3)	S		F	3
Alkyl (C7-C9) nitrates	93															
Alkyl(C8-C40)phenol sulphide (LOA)	1985	0	NI	0	NR	0	NI	0	0	(1)	1	1			FD	1
Alkyl (C8-C40) phenol sulphide	2253															
Alkyl(C8-C9)phenylamine, in aromatic solvent (LOA)	2096	2	NI	2	NR	3	NI	(0)	(0)	(2)	2	2			S	2
Alkyl (C8-C9) phenylamine in aromatic solvents	2200															
Alkyl (C9-C15) phenyl propoxylate	2188	0	NI	0	NR	0	NI	0	0	(2)	2	2			FD	2
Alkyl (C9-C15) phenyl propoxylate	2430															
Alkyl[(C8-C10)/(C12-C14)];(<40%/>60%)polyglucoside mixture solution (max 55% active material)	2134	3	NI	3	R	3	0	0	0	(3)	2	3			D	3
Alkyl (C8-C10)/(C12-C14);(40% or less/60% or more) polyglucoside solution (55% or less)	2248															
Alkyl[(C8-C10)/(C12-C14)];(>60%/<40%)polyglucoside mixture solution (max 55% active material)	2135	3	NI	3	R	2	0	0	0	(2)	2	2			D	2
Alkyl (C8-C10)/(C12-C14);(60% or more/40% or less) polyglucoside solution(55% or less)	2246															
Alkyl(C8-C10)polyglucoside solution (max 65% active material)	2136	1	NI	1	R	2	0	0	0	(2)	2	2			D	2
Alkyl (C8-C10) polyglucoside solution (65% or less)	2245															
Alkyl (C8-C10)/(C12-C14);(50%/50%) polyglucoside solution (55% or less)	2133	3	NI	3	R	2	0	0	0	(3)	2	(3)			D	3
Alkyl (C8-C10)/(C12-C14);(50%/50%) polyglucoside solution (55% or less)	2247															
Alkyl(C12-C14)polyglucoside solution (max 55% active material)	2137	3	NI	3	R	3	0	0	0	(3)	2	3			D	3
Alkyl (C12-C14) polyglucoside solution (55% or less)	2249															
Alkyl(C12-C14)polyglucoside solution (max 55% active material)	2137	3	NI	3	R	3	0	0	0	(3)	2	3			D	3
Lauryl polyglucose (50% or less)	416															
Alkylsulphonic acid ester of phenol (MESAMOLL)	1878	5	NI	5	NR	0	NI	0	(0)	(0)	0	0			S	0
Alkyl sulphonic acid ester of phenol	1701															
Alkyltoluenes	2374	0	2	2	NR	0	NI	0	(0)	(1)	0	1			Fp	2
Alkyl (C18+) toluenes	3148															
Alkyl(C18-C28)toluenesulfonic acid (>90% in mineral oil)	2429	0	4	4	NR	3	NI	0	0	(3)	2	3	S		Fp	3
Alkyl(C18-C28)toluenesulfonic acid	3658															
Alkyl(C18-C28)toluenesulfonic acid, calcium salts, borated (up to 70% in mineral oil)	2404	0	4	4	NR	0	NI	(0)	(0)	(1)	(1)	(1)	S		S	2
Alkyl(C18-C28)toluenesulfonic acid, calcium salts, borated	3661															
Alkyl(C18-C28)toluenesulfonic acid, calcium salts, high overbase (up to 70% in mineral oil)	2373	(0)	(4)	(4)	(NR)	(0)	NI	0	0	(0)	0	0	S		S	2

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Alkyl (C18-C28) toluenesulphonic acid, calcium salts, high overbase	3149															
Alkyl(C18-C28)toluenesulfonic acid, calcium salts, low overbase (up to 60% in mineral oil)	2409	0	4	4	NR	0	NI	0	0	(2)	2	0	S		Fp	3
Alkyl (C18-C28) toluenesulphonic acid, calcium salts, low overbase	3685															
Allyl alcohol	28	0	0	0	R	4	NI	2	3	4	2	3	A		D	3
Allyl alcohol	105															
Aluminium chloride/hydrogen chloride solution	336	Inorg	NI	2	Inorg	3	1	1	(0)	3	(3C)	3			D	3
Aluminium chloride (30% or less)/Hydrochloric acid (20% or less) solution	110															
Aluminium hydroxide, sodium hydroxide, sodium carbonate solution (40% or less)	2438	Inorg	0	0	Inorg	3	NI	0	0	(3)	3B	(3)			D	3
Aluminium hydroxide, sodium hydroxide, sodium carbonate solution (40% or less)	3807															
Aluminium sulphate solution	2205	Inorg	Inorg	2	Inorg	3	1	1	(0)	(3)	(2)	(3)			D	3
Aluminium sulphate solution	111															
2-(2-Aminoethoxy) ethanol	75	0	0	0	NR	1	0	0	1	(3)	3	3			D	3
2-(2-Aminoethoxy) ethanol	37															
Aminoethylethanolamine	68	0	0	0	NR	1	0	0	0	(3)	3B	2	S		D	3
Aminoethyl ethanolamine	112															
Aminoethylethanolamine/Aminoethyldiethanolamine solution	74	Inorg	0	0	NR	1	0	(0)	(0)	(3)	(3B)	(2)	S		D	3
Aminoethyldiethanolamine/Aminoethylethanolamine solution	113															
N-Aminoethylpiperazine	88	0	0	0	NR	1	NI	0	2	(3)	3	3	S		D	3
N-Aminoethylpiperazine	472															
2-Amino-2-(hydroxymethyl)-1,3-propanediol solution(40% or less)	89	0	NI	0	NI	1	NI	0	0	NI	NI	NI			D	NI
2-Amino-2-hydroxymethyl-1,3-propanediol solution (40% or less)	38															
2-Amino-2-methyl-1-propanol	90	0	0	0	NR	1	NI	0	0	(3)	3	3			DE	3
2-Amino-2-methyl-1-propanol	39															
Ammonia (anhydrous and aqueous, 28% or less)	91	0	0	0	R	3	2	1	(2)	3	3	3			DE	3
Ammonia aqueous (28% or less)	114															
Ammonium bisulphite solution, greater than 15%	1730	NI	NI	NI	NI	1	NI	NI	NI	NI	2	2			D	2
Ammonium bisulphite solution (70% or less)	115															
Ammonium chloride solution (less than 25%)	2388	0	NI	0	Inorg	1	0	0	(0)	(2)	2	2			D	2
Ammonium chloride solution (less than 25%) (*)	3411															
Ammonium lignosulphonate (46% solution in water)	2086	0	NI	0	NR	0	NI	0	(0)	(0)	0	0			D	0

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Ammonium lignosulphonate solutions	118	RTECS No			CAS No			8061-53-0										
Ammonium nitrate solutions	1912	Inorg	0	0	Inorg	1	NI	0	0	(2)	1	2				D	2	
Ammonium nitrate solution (93% or less)	119	RTECS No			CAS No													
Ammonium polyphosphate solution	1764	Inorg	0	0	Inorg	1	NI	0	0	0	1	0				D	1	
Ammonium polyphosphate solution	120	RTECS No			CAS No			10-34-0										
Ammonium sulphate	99	0	0	0	Inorg	1	(0)	0	(0)	(0)	0	0				D	0	
Ammonium sulphate solution	121	RTECS No			BS4500000	CAS No			7783-20-2									
Ammonium sulphide soln.(45% or less)	310	Inorg	0	0	Inorg	3	NI	1	0	(2)	2	2	N				D	2
Ammonium sulphide solution (45% or less)	122	RTECS No			BS4900000	CAS No			12124-99-1									
Ammonium thiocyanate/ Ammonium thiosulphate solution	1732	Inorg	0	0	Inorg	1	NI	1	NI	NI	NI	NI				D	NI	
Ammonium thiocyanate (25% or less)/Ammonium thiosulphate (20% or less) solution	123	RTECS No			CAS No													
Ammonium thiosulphate solution (60% or less)	312	Inorg	0	0	Inorg	1	NI	0	(0)	(1)	(1)	(1)				D	1	
Ammonium thiosulphate solution (60% or less)	124	RTECS No			XN6465000	CAS No			7783-18-8									
Amyl acetate	255	2	2	2	NR	2	NI	0	(0)	0	1	1	S	NT	FED	2		
Amyl acetate (all isomers)	125	RTECS No			AJ1925000	CAS No			628-63-7									
tert-Amyl ethyl ether	2428	3	NI	3	NR	1	NI	0	(0)	0	2	2				E	2	
tert-Amyl ethyl ether	3623	RTECS No			CAS No													
tert-Amyl methyl ether	2141	1	NI	1	NI	4	NI	1	0	(2)	0	1				ED	2	
tert-Amyl methyl ether	2210	RTECS No			CAS No													
Amyl propionate	1484	2	NI	2	R	2	NI	0	0	(2)	2	1				F	2	
n-Pentyl propionate	484	RTECS No			CAS No			624-54-4										
Aniline	261	0	0	0	R	3	2	2	2	3	1	3	CTS	NT	FD	3		
Aniline	127	RTECS No			BW6650000	CAS No			62-53-3									
Apple juice	275	0	NI	0	R	0	0	0	0	0	0	0				D	0	
Apple juice	130	RTECS No			CAS No													
Aryl polyolefin (C11-C50) (LOA)	1979	NI	NI	0	NR	0	NI	0	0	0	0	0				Fp	2	
Aryl polyolefins (C11-C50)	131	RTECS No			CAS No													
L-Aspartic acid, homopolymer, sodium salt (aqueous solution)	2421	0	0	0	NR	0	NI	0	(0)	0	0	0				D	0	
L-Aspartic acid, homopolymer, sodium salt (aqueous solution)	3697	RTECS No			CAS No													
Aviation alkylates (C8 paraffins and iso-paraffins BPT 95-120 Celcius)	286	(5)	NI	(5)	(R)	(4)	NI	0	0	(0)	(0)	(0)				FE	2	

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Aviation alkylates (C8 paraffins and iso-paraffins BPT 95 - 120°C)	132	RTECS No			CAS No													
Aziridine polymer with methyloxirane (78% in diethylene glycol monoethyl ether)	2436	0	NI	0	NR	2	0	0	0	0	1	0				Fp	2	
Aziridine polymer with methyloxirane (78% in diethylene glycol monoethyl ether)	3751	RTECS No			CAS No													
Barium long chain alkaryl sulphonate (C11-C50) (LOA)	1978	4	NI	4	NR	3	NI	2	0	(2)	0	0				S	2	
Barium long chain (C11-C50) alkaryl sulphonate	2370	RTECS No			CAS No													
Benzene	324	2	1	1	R	2	NI	1	0	0	2	2	CTM	NT	E	3		
Benzene and mixtures having 10% benzene or more (i)	133	RTECS No			CY1400000	CAS No			71-43-2									
Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl), 4-hydroxy-C7-C9 alcohols branched and linear	2378	0	3	3	NR	3	0	0	0	(0)	0	0				Fp	2	
3,5-bis(1,1-dimethylethyl)-4-hydroxybenzenepropanoic acid, (C7-C9)-branched alkyl esters	3405	RTECS No			CAS No													
Benzene sulphonyl chloride	320	1	1	1	R	3	NI	1	(2)	(3)	3	3	S				SD	3
Benzene sulphonyl chloride	134	RTECS No			DB8750000	CAS No			98-09-9									
1,2,4-Benzene tricarboxylic acid, trioctyl ester	1733	0	0	0	NR	0	NI	0	(0)	2	1	1				Fp	2	
Benzenetricarboxylic acid, trioctyl ester	136	RTECS No			CAS No													
Benzyl acetate	348	1	NI	1	R	3	1	1	0	2	1	1				SD	2	
Benzyl acetate	138	RTECS No			AF5075000	CAS No			140-11-4									
Benzyl alcohol	349	1	NI	1	R	2	NI	1	1	2	2	2				SD	2	
Benzyl alcohol	139	RTECS No			DN3150000	CAS No			100-51-6									
Benzyl chloride	352	NI	1	1	R	3	1	1	(2)	3	3	3	CSA				S	3
Benzyl chloride	140	RTECS No			XS8925000	CAS No			100-44-7									
Bis(2-ethylhexyl) terephthalate	2437	0	3	3	R	0	0	0	0	(1)	1	1				Fp	2	
Bis(2-ethylhexyl) terephthalate	3752	RTECS No			CAS No													
N,N-Bis(2-hydroxyethyl)oleamide (LOA)	2110	5	NI	5	NR	NI	NI	0	0	(2)	2	2				Fp	2	
N,N-bis(2-hydroxyethyl) oleamide	2201	RTECS No			CAS No													
Bis[3-(triethoxysilyl)propyl]amine	2444	1	NI	1	R	1	NI	0	0	(2)	2	2				D	2	
Bis[3-(triethoxysilyl)propyl]amine	3823	RTECS No			CAS No			13497-18-2										
Borax, anhydrous or hydrated, crude or refined	359	Inorg	0	0	Inorg	1	0	0	0	(1)	1	1	R				S	3
Borax	143	RTECS No			VZ2275000	CAS No			1303-96-4									
Boric acid	360	Inorg	0	0	Inorg	1	0	0	(0)	(1)	1	1	R				S	3
Boric acid	2254	RTECS No			ED4550000	CAS No			10043-35-3									
Bromochloromethane	2084	1	1	1	NR	1	NI	0	0	0	1	0				SD	1	

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Bromochloromethane	145	RTECS No		PA5250000	CAS No		74-97-5									
1-Bromopropane	2229	2	NI	2	NI	NI	NI	0	(0)	0	(2)	(2)	SD 2			
1-Bromopropane	2696	RTECS No		CAS No												
Butanol	381	0	(0)	0	R	0	NI	0	0	0	2	3	NT D 3			
n-Butyl alcohol	474	RTECS No		EO1400000	CAS No		71-36-3									
Butanol	381	0	(0)	0	R	0	NI	0	0	0	2	3	NT D 3			
Butyl alcohol (all isomers)	2216	RTECS No		EO1400000	CAS No		71-36-3									
sec-Butanol	383	0	(0)	0	R	0	NI	0	0	0	0	2	NT D 2			
sec-Butyl alcohol	638	RTECS No		EO1750000	CAS No		78-92-2									
tert-Butanol	384	0	0	0	NR	1	NI	0	0	0	1	3	NT D 3			
tert-Butyl alcohol	686	RTECS No		EO1925000	CAS No		75-65-0									
2-Butanone	385	0	NI	0	R	1	0	0	0	1	2	2	DE 2			
Methyl ethyl ketone	446	RTECS No		EL6475000	CAS No		78-93-3									
Butene oligomer	386	0	NI	0	NR	(4)	0	0	0	0	0	1	FE 2			
Butene oligomer	146	RTECS No		CAS No												
2-Butoxyethanol/hyperbranched polyesteramide mixture	2446	NI	NI	(0)	NR	(2)	NI	1	2	2	1	2	D 2			
Butyl acetate	3731	RTECS No		CAS No												
Butyl acetate (all isomers)	387	1	NI	1	R	2	NI	0	0	0	0	1	FED 2			
Butyl acetate (all isomers)	147	RTECS No		AF7350000	CAS No		123-86-4									
Butyl acrylate	390	2	NI	2	R	3	NI	1	1	1	2	2	SA	FED 2		
Butyl acrylate (all isomers)	148	RTECS No		UD3150000	CAS No		141-32-2									
Butylamine	392	0	NI	0	R	2	NI	2	2	3	3C	3	DE 3			
Butylamine (all isomers)	154	RTECS No		EO2975000	CAS No		109-73-9									
Butyl benzene	1774	4	NI	4	NI	4	1	0	0	(2)	2	1	Fp 2			
Butylbenzene (all isomers)	155	RTECS No		CY9070000	CAS No		104-51-8									
Butyl benzyl phthalate	398	4	4	4	R	4	2	0	0	(0)	(0)	(0)	R	S 3		
Butyl benzyl phthalate	149	RTECS No		TH9990000	CAS No		85-68-7									
Butyl butyrate	399	2	NI	2	(R)	2	NI	0	0	(1)	1	NI	FE 2			
Butyl butyrate (all isomers)	150	RTECS No		ES8120000	CAS No		109-21-7									
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	2295	(5)	NI	(5)	(R)	(3)	NI	0	0	0	2	2	S	FE 2		

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Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	153	RTECS No		CAS No												
Butylene glycol(s)	402	0	NI	0	R	1	NI	1	0	0	0	0	D 1			
Butylene glycol	156	RTECS No		EK0525000	CAS No		110-63-4									
Butylene glycol methyl ether acetate	953	1	1	1	R	3	NI	0	(0)	(1)	1	1	FED 1			
3-Methoxybutyl acetate	58	RTECS No		EL4725000	CAS No		4435-53-4									
Butylene glycol monomethyl ether	952	0	NI	0	R	1	NI	0	0	(1)	0	1	D 1			
3-Methoxy-1-butanol	57	RTECS No		CAS No		2517-43-3										
1,2-Butylene oxide	403	0	NI	0	NR	2	NI	1	1	2	1	1	C	DE 3		
1,2-Butylene oxide	8	RTECS No		EK3675000	CAS No		106-88-7									
Butyl methacrylate	409	2	NI	2	NR	1	NI	0	0	0	2	2	S	FE 2		
Butyl methacrylate	151	RTECS No		OZ3675000	CAS No		97-88-1									
Butyl octyl phthalate	410	5	NI	5	(R)	0	2	0	(0)	(1)	(1)	(1)	Fp 2			
Butyl octyl phthalate	2749	RTECS No		CAS No		84-78-6										
Butyl phosphate/dibutyl phosphate mixture	2434	2	NI	2	R	1	0	0	(0)	(3)	2	3	D 3			
Butyl phosphate/dibutyl phosphate mixture	3749	RTECS No		CAS No												
Butyl propionate	1483	2	NI	2	R	2	NI	0	0	0	1	1	FED 2			
n-Butyl propionate	476	RTECS No		UE8245000	CAS No		590-01-2									
Butyl stearate	413	0	NI	0	(R)	0	NI	0	NI	NI	2	NI	Fp 2			
Butyl stearate	152	RTECS No		WI2900000	CAS No		123-95-5									
Butyraldehyde	416	1	NI	1	R	2	0	0	1	0	3	3	DE 3			
Butyraldehyde (all isomers)	157	RTECS No		ES2275000	CAS No		123-72-8									
Butyric acid	418	0	NI	0	R	2	0	0	0	0	3A	3	D 3			
Butyric acid	158	RTECS No		ES5425000	CAS No		107-92-6									
Butyrolactone	420	0	NI	0	R	(3)	NI	1	(0)	0	0	1	C	D 3		
gamma-Butyrolactone	360	RTECS No		LU3500000	CAS No		96-48-0									
Calcium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	70	0	NI	0	NR	2	NI	0	0	(1)	(1)	(1)	S	Fp 3		
Calcium long-chain alkyl salicylate (C13+)	166	RTECS No		CAS No												
Calcium alkyl phenol sulphide, polyolefin phosphorusulphide mixture (LOA)	1435	NI	NI	NI	NR	4	NI	0	0	(0)	NI	NI	NI NI			
Calcium alkyl (C9) phenol sulphide/Polyolefin phosphorusulphide mixture	160	RTECS No		CAS No												
Calcium alkyl salicylate	2015	3	NI	3	NR	2	NI	0	0	(2)	2	2	Fp 2			

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Calcium alkyl (C10-C28) salicylate	3152	RTECS No			CAS No												
Calcium bromide (solutions)	427	Inorg	NI	0	Inorg	0	0	(0)	(0)	(2)	(1)	(2)				D	2
Drilling brines, including:calcium bromide solution, calcium chloride solution and sodium chloride solution	308	RTECS No			EV9328000	CAS No			7789-41-5								
Calcium carbonate slurry	2016	Inorg	0	0	Inorg	0	NI	0	(0)	(0)	0	0				S	0
Calcium carbonate slurry	161	RTECS No			FF9335000	CAS No			471-34-1								
Calcium hydroxide	431	Inorg	0	0	Inorg	2	NI	0	(0)	(2)	1	2				S	2
Calcium hydroxide slurry	162	RTECS No			EW2800000	CAS No			1305-62-0								
Calcium hypochlorite solutions containing 15% Ca(OCl)2 or more	432	Inorg	0	0	Inorg	5	NI	1	0	2	3A	3				D	3
Calcium hypochlorite solution (more than 15%)	164	RTECS No			NH3485000	CAS No			7778-54-3								
Calcium hypochlorite solutions containing less than 15% but more than 1.5% Ca(OCl)2	2073	Inorg	0	0	Inorg	(4)	NI	1	0	2	3A	3				D	3
Calcium hypochlorite solution (15% or less)	163	RTECS No			NH3485000	CAS No			7778-54-3								
Calcium lignosulphonate (52% solution in water)	2087	0	NI	0	NR	0	NI	0	(0)	(0)	0	0				D	0
Calcium lignosulphonate solutions	165	RTECS No			CAS No			8061-52-7									
Calcium long chain alkaryl sulphonate (C11-C50) (LOA)	1973	NI	0	0	NR	0	NI	0	0	(1)	1	1	S			FD	2
Calcium alkaryl sulphonate (C11-C50)	169	RTECS No			CAS No												
Calcium long chain alkyl (C5-C10) phenate (LOA)	2106	0	NI	0	NR	2	NI	0	0	(0)	0	0				FD	1
Calcium long-chain alkyl(C5-C10) phenate	168	RTECS No			CAS No												
Calcium long chain alkyl (C11-C40) phenate (LOA)	2097	0	NI	0	NR	0	NI	0	0	(1)	1	1				Fp	2
Calcium long-chain alkyl(C11-C40) phenate	167	RTECS No			CAS No												
Calcium long chain alkyl phenate sulphide (C8-C40) (LOA)	1756	0	NI	0	NR	1	NI	0	0	(1)	1	1				Fp	2
Calcium long-chain alkyl phenate sulphide (C8-C40)	170	RTECS No			CAS No												
Calcium long-chain alkyl phenolic amine (C8-C40)	1728	NI	NI	NI	NR	0	NI	0	0	(1)	1	(1)				Fp	2
	171	RTECS No			CAS No												
Calcium long-chain alkyl (C18-C28) salicylate	2383	0	NI	0	NR	0	NI	0	0	(1)	1	0	S			Fp	3
Calcium long-chain alkyl (C18-C28) salicylate	3426	RTECS No			CAS No												
Calcium nitrate	1803	Inorg	0	0	Inorg	0	NI	0	(0)	(1)	1	1				D	1
Calcium nitrate solutions (50% or less)	172	RTECS No			EW2985000	CAS No			10124-37-5								
Calcium nitrate/ Magnesium nitrate/Potassium chloride solution	1734	Inorg	0	0	Inorg	1	0	0	(0)	(1)	(1)	1				D	1
Calcium nitrate/Magnesium nitrate/Potassium chloride solution	173	RTECS No			CAS No												
Camelina oil	2440	(0)	NI	(0)	(R)	(0)	(0)	(0)	(0)	(1)	(0)	(1)				Fp	2

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Camelina oil	3767	RTECS No			CAS No			68956-68-3									
Camphor oil, white	1897	NI	NI	NI	NI	NI	NI	2	NI	(2)	1	NI	(T)		FE	2	
Camphor oil	174	RTECS No			EX1490000	CAS No			8008-51-3								
Caprolactam	436	0	NI	0	R	1	0	1	1	2	1	2				D	3
epsilon-Caprolactam (molten or aqueous solutions)	310	RTECS No			CM3675000	CAS No			105-60-2								
Carbolic oil	437	(3)	3	(3)	(NR)	(3)	(1)	2	2	3	3	3	ATNCM			FED	3
Carbolic oil	176	RTECS No			CAS No												
Carbon disulphide	439	2	1	1	NR	3	NI	2	(3)	4	3A	3	RN			SD	3
Carbon disulphide	177	RTECS No			FF6650000	CAS No			75-15-0								
Cashew nut shell oil (untreated)	443	0	NI	0	R	0	NI	(0)	(0)	(2)	2	(2)	S			Fp	3
Cashew nut shell oil (untreated)	179	RTECS No			CAS No												
Castor oil (containing less than 10% free fatty acids)	2314	0	NI	0	R	(2)	NI	0	0	(1)	1	1				Fp	2
Castor oil	3044	RTECS No			CAS No												
Cesium Formate, drilling brines	2384	0	3	3	Inorg	2	NI	1	0	(2)	2	2				D	2
Cesium formate solution (*)	3421	RTECS No			CAS No			3495-36-1									
Cetyl/Eicosyl methacrylate (mixture)	445	0	NI	0	(NR)	(0)	NI	0	(0)	(1)	(1)	(1)				Fp	2
Cetyl/Eicosyl methacrylate mixture	180	RTECS No			CAS No												
Chlorinated paraffins (C18 and above) with any level of chlorine	2024	0	4	4	NR	0	2	0	0	(1)	(1)	(1)	C			S	3
Chlorinated paraffins (C18+) with any level of chlorine	183	RTECS No			CAS No												
Chlorinated paraffins (C10-C13) with 60% chlorine or more	2021	5	5	5	NR	5	2	0	0	(1)	1	1	C			S	3
Chlorinated paraffins (C10-C13)	181	RTECS No			CAS No												
Chlorinated paraffins (C10- C13) with less than 60% chlorine	2020	5	5	5	NR	5	3	(0)	(0)	(1)	(1)	(1)	C			S	3
Chlorinated paraffins (C10-C13) (60% chlorine or less)	2832	RTECS No			CAS No												
Chlorinated paraffins (C14-C17) with less than 1% shorter chain length	2112	5	4	4	NR	6	3	0	0	(2)	2	2	C			S	3
Chlorinated paraffins (C14-C17) (with 50% chlorine or more, and less than 1% C13 or shorter chains)	182	RTECS No			CAS No												
Chloroacetic acid	450	0	NI	0	R	2	0	2	3	(4)	3C	3	A			D	3
Chloroacetic acid (80% or less)	184	RTECS No			AF8575000	CAS No			79-11-8								
Chlorobenzene	456	2	2	2	NR	3	0	1	0	2	2	0				S	2
Chlorobenzene	185	RTECS No			CZ0175000	CAS No			108-90-7								
Chlorohydrins	463	0	NI	0	R	0	NI	(2)	(2)	(3)	(3A)	3	CS			D	3

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Chlorohydrins (crude)	187	RTECS No			TY4025000			CAS No			96-24-2					
N-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less)	2286	0	0	0	NR	1	NI	0	0	(2)	0	(2)	SC		D	3
N-(3-Chloro-2-hydroxypropyl)trimethyl ammonium chloride solution (75% or less)	2579	RTECS No						CAS No								
4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt solution	1536	2	NI	2	NI	2	NI	1	0	2	1	1	S		S	2
4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt solution	62	RTECS No						CAS No								
Chloronitrobenzenes	467	2	2	2	NR	3	NI	2	2	2	1	1			S	2
o-Chloronitrobenzene	533	RTECS No			CZ0855000			CAS No			25167-93-5					
1-(4-Chlorophenyl)-4,4-dimethyl-3-pentanone	1772	3	3	3	NR	3	NI	0	0	(1)	1	0			S	1
1-(4-Chlorophenyl)-4,4- dimethyl-pentan-3-one	21	RTECS No						CAS No								
2-Chloropropionic acid	474	0	NI	0	R	1	NI	1	(3)	2	3A	3			D	3
2- or 3-Chloropropionic acid	36	RTECS No			UE8570000			CAS No			598-78-7					
3-Chloropropylene	478	1	1	1	R	3	NI	1	0	2	1	3	T		E	3
Allyl chloride	106	RTECS No			UC7350000			CAS No			107-05-1					
Chlorosulphonic acid	479	Inorg	0	0	Inorg	2	NI	(2)	(3)	4	3C	3			D	3
Chlorosulphonic acid	188	RTECS No			FX5730000			CAS No			7790-94-5					
m-Chlorotoluene	481	3	NI	3	NR	2	NI	2	0	(2)	1	1			S	2
m-Chlorotoluene	426	RTECS No			XS8990000			CAS No			108-41-8					
o-Chlorotoluene	480	3	3	3	NR	3	1	0	0	0	1	1			S	1
o-Chlorotoluene	534	RTECS No			XS9000000			CAS No			95-49-8					
o-Chlorotoluene	480	3	3	3	NR	3	1	0	0	0	1	1			S	1
Chlorotoluenes (mixed isomers)	189	RTECS No			XS9000000			CAS No			95-49-8					
p-Chlorotoluene	482	3	3	3	NR	3	0	0	0	0	1	1			S	2
p-Chlorotoluene	551	RTECS No			XS9010000			CAS No			106-43-4					
Choline chloride, solutions	485	0	NI	0	R	1	NI	0	(0)	(0)	0	0			D	0
Choline chloride solutions	190	RTECS No			KH2975000			CAS No			67-48-1					
Citric acid	493	0	NI	0	R	1	0	0	(0)	(3)	1	3			D	3
Citric acid (70% or less)	748	RTECS No			GE7350000			CAS No			77-92-9					
Citric juices	494	0	0	0	Inorg	0	0	0	0	0	0	0			D	0
Water	740	RTECS No						CAS No								
Clay	495	Inorg	0	0	Inorg	0	0	0	0	0	0	0			S	0

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Clay slurry	191	RTECS No						CAS No								
Coal slurry	498	Inorg	0	0	Inorg	0	0	0	0	0	0	0			S	0
Coal slurry	192	RTECS No						CAS No								
Coal tar	499	(4)	4	4	NR	3	1	0	0	0	2	2	CMR	(T)	S	3
Coal tar	193	RTECS No			GF8600000			CAS No			8007-45-2					
Coal tar naphtha	500	3	NI	3	NR	3	NI	0	0	(1)	1	1	C	(T)	FE	3
Coal tar naphtha solvent	194	RTECS No			DE3030000			CAS No			8030-30-6					
Coal tar pitch (molten)	491	3	(3)	(3)	NR	(4)	(2)	0	0	(1)	1	0	CM		S	3
Coal tar pitch (molten)	195	RTECS No			GF8655000			CAS No			65996-93-2					
Cobalt naphthenate in solvent naphtha	501	NI	NI	NI	NR	3	NI	0	(0)	(1)	NI	1	C		FE	3
Cobalt naphthenate in solvent naphtha	196	RTECS No						CAS No								
Cocoa butter	2342	0	NI	0	R	0	NI	(0)	(0)	(1)	(0)	(1)			Fp	2
Cocoa butter	3096	RTECS No						CAS No								
Coconut acid oil	2370	0	0	0	R	3	NI	(0)	(0)	(1)	(1)	(1)			Fp	2
Coconut acid oil	3139	RTECS No						CAS No								
Coconut fatty acid distillate	2366	0	NI	0	R	(3)	NI	0	(0)	(1)	(1)	(1)			Fp	2
Coconut fatty acid distillate	3130	RTECS No						CAS No								
Coconut oil	503	0	NI	0	R	1	NI	0	(0)	(1)	0	(1)			Fp	2
Coconut oil	2772	RTECS No			GG6040000			CAS No			8001-31-8					
Coconut oil fatty acid	505	0	0	0	(R)	(3)	NI	0	(0)	(1)	(1)	(1)			Fp	2
Coconut oil fatty acid	197	RTECS No						CAS No			61788-47-4					
Coconut oil fatty acid methyl ester	506	5	0	0	R	0	NI	(0)	(0)	(0)	(0)	(1)			Fp	2
Coconut oil fatty acid methyl ester	198	RTECS No						CAS No			61788-59-8					
Copper salt of long chain(>C17) alkanolic acid (LOA)	2111	0	NI	0	(R)	2	NI	0	0	(0)	0	0			Fp	2
Copper salt of long chain (C17+) alkanolic acid	2214	RTECS No						CAS No								
Corn oil	521	0	NI	0	R	(2)	NI	0	(0)	(1)	1	1			Fp	2
Corn Oil	2781	RTECS No			GM4800000			CAS No			8001-30-7					
Cotton seed oil	523	0	NI	0	R	(2)	NI	(0)	(0)	(1)	0	1			Fp	2
Cotton seed oil	2783	RTECS No			GN2815000			CAS No			8001-29-4					
Creosote (coal tar)	524	(4)	(4)	(4)	NR	4	(2)	1	0	2	2	1	CM	(T)	S	3

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Creosote (coal tar)	199		RTECS No		GF8615000			CAS No		8001-58-9						
Creosote (wood tar)	525	NI	NI	NI	NR	5	NI	1	0	2	2	1	CM	(T)	SD	3
Creosote (wood)	200		RTECS No		GO5870000			CAS No		8021-39-4						
Cresols (mixed isomers)	527	2	2	2	R	3	0	2	2	4	3A	3		T	SD	3
Cresols (all isomers)	201		RTECS No		GO5950000			CAS No		1319-77-3						
Cresylic acids, dephenolized	1875	2	2	2	R	3	0	(2)	(2)	(3)	(3A)	(3)		(T)	S	3
Cresylic acid, dephenolized	202		RTECS No					CAS No								
Cresylic acid, sodium salt solution	1914	(2)	(2)	(2)	(R)	(3)	(0)	1	(1)	(3)	3	3	TCM	(T)	D	3
Cresylic acid, sodium salt solution	203		RTECS No					CAS No								
Crotonaldehyde	528	0	NI	0	NR	4	1	2	4	4	2	3	S		D	3
Crotonaldehyde	204		RTECS No		GP9499000			CAS No		4170-30-3						
Crude Piperazine	2331	0	NI	0	R	2	NI	(1)	(2)	(3)	3	3	S		D	3
Crude Piperazine	2810		RTECS No					CAS No								
Crude Tall Oil	2357	4	NI	4	R	2	0	0	0	(0)	0	0	S		Fp	3
Tall oil, crude	3118		RTECS No					CAS No								
1,5,9-Cyclododecatriene	534	5	5	5	NR	4	NI	0	0	1	2	1	SA		F	3
1,5,9-Cyclododecatriene	17		RTECS No		GU2308000			CAS No		4904-61-4						
Cycloheptane	535	4	NI	4	(NR)	4	NI	(0)	0	(1)	(0)	(1)			FE	2
Cycloheptane	205		RTECS No		GU3140000			CAS No		291-64-5						
Cyclohexane	536	3	3	3	NR	3	NI	0	0	1	0	1			E	2
Cyclohexane	206		RTECS No		GU6300000			CAS No		110-82-7						
Cyclohexanol	537	1	NI	1	R	2	NI	0	0	0	2	2			Fp	2
Cyclohexanol	207		RTECS No		GV7875000			CAS No		108-93-0						
Cyclohexanone	539	0	1	1	R	1	0	1	1	1	2	2			FE	2
Cyclohexanone	208		RTECS No		GW1050000			CAS No		108-94-1						
Cyclohexanone/Cyclohexanol mixture	1436	1	1	1	R	2	NI	1	1	1	2	2			FED	2
Cyclohexanone, Cyclohexanol mixture	209		RTECS No					CAS No								
Cyclohexyl acetate	541	2	NI	2	(R)	(2)	NI	0	0	(2)	2	1			FED	2
Cyclohexyl acetate	210		RTECS No		AG5075000			CAS No		622-45-7						
Cyclohexylamine	542	1	NI	1	R	2	NI	2	2	3	3	3	S		D	3

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Cyclohexylamine	211		RTECS No		GX0700000			CAS No		108-91-8						
1,3-Cyclopentadiene dimer (molten)	545	3	3	3	NR	3	NI	2	0	2	2	2			Fp	2
1,3-Cyclopentadiene dimer (molten)	11		RTECS No		PC1050000			CAS No		77-73-6						
Cyclopentane	546	3	NI	3	NR	3	NI	(0)	(0)	0	1	(1)			E	2
Cyclopentane	212		RTECS No		GY2390000			CAS No		287-92-3						
Cyclopentene	547	2	NI	2	(R)	3	NI	1	1	0	NI	NI			E	2
Cyclopentene	213		RTECS No		GY5950000			CAS No		142-29-0						
Decahydronaphthalene	551	4	4	4	NR	3	NI	0	0	2	2	1			F	1
Decahydronaphthalene	214		RTECS No		QJ3150000			CAS No		91-17-8						
Decane	554	5	NI	5	R	0	0	0	0	0	1	0			F	1
Decane	2620		RTECS No		HD6550000			CAS No		124-18-5						
Decanoic acid	555	4	NI	4	R	4	1	0	0	(2)	2	2			Fp	2
Decanoic acid	215		RTECS No		HD9100000			CAS No		334-48-5						
1-Decene	558	5	NI	5	R	4	2	0	0	0	2	0	A		F	3
Decene	216		RTECS No					CAS No		872-05-9						
Decyl acetate	1767	4	NI	4	NI	NI	NI	0	0	(1)	(1)	(1)			F	1
Decyl acetate	217		RTECS No					CAS No		112-17-4						
Decyl acrylate	559	5	NI	5	(R)	5	NI	0	0	(2)	2	1			Fp	2
Decyl acrylate	218		RTECS No		AS7400000			CAS No		2156-96-9						
Decyloxytetrahydrothiophene dioxide	1859	3	NI	3	NR	4	NI	0	0	(1)	1	0			Fp	2
Decyloxytetrahydrothiophene dioxide	220		RTECS No					CAS No								
Dextrose solution	562	0	0	0	R	0	NI	0	0	0	0	(0)			D	0
Glucose solution	361		RTECS No		LZ6600000			CAS No		50-99-7						
Dextrose solution	562	0	0	0	R	0	NI	0	0	0	0	(0)			D	0
Dextrose solution	221		RTECS No		LZ6600000			CAS No		50-99-7						
Diacetone alcohol	563	0	NI	0	R	1	0	0	0	(2)	2	2			D	2
Diacetone alcohol	226		RTECS No		SA9100000			CAS No		123-42-2						
Dialkyldiphenylamines (LOA)	1852	5	NI	5	NR	1	0	0	0	(0)	0	0			FD	0
Dialkyl (C8-C9) diphenylamines	2255		RTECS No					CAS No								
Dialkyl (C9 - C10) phthalates	2359	(0)	(0)	(0)	(R)	(0)	(0)	(0)	(0)	(1)	(1)	(1)			Fp	2

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Dialkyl (C9 - C10) phthalates	3121	RTECS No			CAS No												
Dialkyl phthalates C9-C13	566	(0)	(4)	(4)	(NR)	(0)	(2)	(0)	(0)	(1)	(1)	(1)	R		Fp	3	
Dialkyl (C7-C13) phthalates	227	RTECS No			CAS No												
Diammonium hydrogen phosphate	98	0	0	0	Inorg	1	NI	0	0	(0)	(1)	(1)			D	1	
Ammonium hydrogen phosphate solution	117	RTECS No			CAS No			7783-28-0									
Dibromomethane	574	1	NI	1	NR	(2)	NI	1	0	0	(2)	(2)			SD	2	
Dibromomethane	228	RTECS No			CAS No			PA7350000 74-95-3									
Di-n-butylamine	577	2	NI	2	R	3	NI	2	2	3	3	3			FD	3	
Dibutylamine	231	RTECS No			CAS No			HR7780000 111-92-2									
Di-butyl ether	578	3	3	3	NR	2	NI	0	0	0	1	1			FE	2	
n-Butyl ether	475	RTECS No			CAS No			EK5425000 142-96-1									
Dibutyl hydrogen phosphonate	1857	1	NI	1	NI	2	NI	0	0	(3)	3	3			F	3	
Dibutyl hydrogen phosphonate	229	RTECS No			CAS No			1809-19-4									
2,4-Di-tert-butyl phenol	2083	5	4	4	NR	4	NI	NI	NI	NI	NI	NI			NI	NI	
2,4-Di-tert-butylphenol	2339	RTECS No			CAS No			SK8260000 96-76-4									
2,6-Di-tert-butyl phenol	2082	4	NI	4	NR	4	NI	0	0	(1)	1	1			Fp	2	
2,6-Di-tert-butylphenol	2250	RTECS No			CAS No			SK8265000 128-39-2									
Di-n-butyl phthalate	582	4	4	4	R	4	1	0	0	1	0	1	R		S	3	
Dibutyl phthalate	230	RTECS No			CAS No			TI0875000 84-74-2									
Dibutyl terephthalate	2430	5	(3)	(3)	R	4	2	0	0	(0)	0	0			S	0	
Dibutyl terephthalate	3596	RTECS No			CAS No												
Dichlorobenzene (all isomers)	333	3	4	4	NR	3	1	1	0	1	(2)	2	CMR	T	S	3	
Dichlorobenzene (all isomers)	232	RTECS No			CAS No												
3,4-Dichlorobut-1-ene	2079	2	2	2	NR	3	NI	1	0	2	2	3			S	3	
3,4-Dichloro-1-butene	56	RTECS No			CAS No			EM4740000 760-23-6									
1,1-Dichloroethane	590	1	NI	1	NR	1	NI	1	(1)	0	2	2			SD	2	
1,1-Dichloroethane	4	RTECS No			CAS No			KI0175000 75-34-3									
1,2-Dichloroethane	591	1	1	1	NR	2	0	1	0	2	1	2	C		SD	3	
Ethylene dichloride	330	RTECS No			CAS No			KI0525000 107-06-2									
1,6-Dichlorohexane	593	3	NI	3	NR	3	NI	0	(0)	(0)	0	0			S	0	

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1,6-Dichlorohexane	19	RTECS No			CAS No			2163-00-0									
Dichloromethane	594	1	2	2	NR	1	0	1	0	0	2	2	C		SD	3	
Dichloromethane	234	RTECS No			CAS No			PA8050000 75-09-2									
2,4-Dichlorophenol	596	3	2	2	NR	3	2	3	2	3	3	3		T	S	3	
2,4-Dichlorophenol	30	RTECS No			CAS No			SK8575000 120-83-2									
2,4-Dichlorophenoxyacetic acid, diethanolamine salt, solution	599	0	1	1	R	2	NI	1	0	(3)	1	3		(T)	D	3	
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution	32	RTECS No			CAS No												
2,4-Dichlorophenoxyacetic acid, dimethylamine salt, 70 % or less solution	600	0	1	1	R	3	NI	1	0	(3)	1	3		(T)	D	3	
2,4-Dichlorophenoxyacetic acid, dimethylamine salt solution (70% or less)	33	RTECS No			CAS No												
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt soln.	602	0	NI	0	R	2	NI	1	0	(3)	(1)	3		(T)	D	3	
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution	34	RTECS No			CAS No												
1,1-Dichloropropane	605	2	1	1	NR	2	1	0	0	1	1	1			SD	1	
1,1-Dichloropropane	5	RTECS No			CAS No			TX9450000 78-99-9									
1,2-Dichloropropane	606	2	1	1	NR	2	0	1	0	2	2	2			SD	2	
1,2-Dichloropropane	9	RTECS No			CAS No			TX9625000 78-87-5									
1,3-Dichloropropane	607	2	1	1	NR	2	1	0	NI	NI	NI	NI			SD	NI	
1,3-Dichloropropane	12	RTECS No			CAS No			TX9660000 142-28-9									
Dichloropropane and dichloropropene, mixture	608	(2)	(1)	(1)	(NR)	(4)	(1)	2	1	2	3	3	CS		SD	3	
Dichloropropene/Dichloropropane mixtures	235	RTECS No			CAS No			TX9800000 8003-19-8									
1,3-Dichloropropene	612	1	NI	1	NR	4	1	2	1	2	3	3	CS		SD	3	
1,3-Dichloropropene	13	RTECS No			CAS No			UC8310000 542-75-6									
2,2-Dichloropropionic acid	609	2	2	2	NR	2	NI	1	0	(3)	3	3			D	3	
2,2-Dichloropropionic acid	28	RTECS No			CAS No			UF0690000 75-99-0									
Di-(2-chloro-iso-propyl) ether	615	2	2	2	NR	2	NI	2	0	2	0	2			SD	2	
2,2'-Dichloroisopropyl ether	25	RTECS No			CAS No			KN1750000 108-60-1									
Dicyclopentadiene(80-90%)/Co-dimers(10-20%), mixtures	2389	2	3	3	NR	3	0	2	0	3	2	2	AR		FED	3	
Dicyclopentadiene, Resin Grade, 81-89%	3559	RTECS No			CAS No												
Diethanolamine	620	0	NI	0	R	1	0	1	0	0	2	3	T		D	3	
Diethanolamine	236	RTECS No			CAS No			KL2975000 111-42-2									
Diethylamine	621	0	NI	0	R	2	NI	1	2	3	3C	3			DE	3	

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Diethylamine	240		RTECS No		HZ8750000				CAS No		109-89-7					
2,6-Diethylaniline	1437	3	3	3	NR	2	NI	1	1	(2)	1	2			FD	2
2,6-Diethylaniline	35		RTECS No		BX3500000				CAS No		579-66-8					
Diethyl benzene (mixed isomers)	624	4	4	4	NR	3	NI	0	(0)	(2)	2	1			F	2
Diethylbenzene	242		RTECS No		CZ5600000				CAS No		25340-17-4					
Di-(2-ethylbutyl) phthalate	625	5	NI	5	R	0	2	0	0	(1)	1	(1)	R		Fp	3
Di-(2-ethylbutyl) phthalate	2750		RTECS No		TI1100000				CAS No		84-75-3					
Diethylene glycol	628	0	NI	0	R	0	0	1	0	2	1	1			D	2
Diethylene glycol	243		RTECS No		ID5950000				CAS No		111-46-6					
Diethylene glycol di-n-butyl ether	629	2	NI	2	NI	1	NI	0	0	(1)	1	1			FD	1
Diethylene glycol dibutyl ether	244		RTECS No		KN0350000				CAS No		112-73-2					
Diethylene glycol diethyl ether	630	0	NI	0	NR	0	NI	1	0	(2)	(2)	2			D	2
Diethylene glycol diethyl ether	245		RTECS No		KN3160000				CAS No		112-36-7					
Diethylene glycol initiated polyoxypropylene diamine	2353	0	NI	0	NR	2	NI	0	0	(3)	3B	(3)			D	3
Diethylene glycol initiated polyoxypropylene diamine	3113		RTECS No						CAS No							
Diethylene glycol initiated polyoxypropylene diamine	2353	0	NI	0	NR	2	NI	0	0	(3)	3B	(3)			D	3
Polyetheramine	2946		RTECS No						CAS No							
Diethylene glycol phthalate	1438	2	NI	2	NR	1	NI	0	0	(2)	(1)	2			S	2
Diethylene glycol phthalate	247		RTECS No						CAS No							
Diethylene triamine	638	0	1	1	(R)	2	NI	1	3	3	3A	3	S		FD	3
Diethylenetriamine	248		RTECS No		IE1225000				CAS No		111-40-0					
Diethylenetriamine pentaacetic acid, pentasodium salt (40% solution in water)	2076	0	NI	0	NR	0	NI	0	(0)	(0)	0	0			D	0
Diethylenetriaminepentaacetic acid, pentasodium salt solution	249		RTECS No						CAS No							
Diethyl ethanolamine	622	0	NI	0	NR	3	NI	1	1	2	3	3			D	3
Diethylaminoethanol	241		RTECS No		KK5075000				CAS No		100-37-8					
Diethyl ether	640	0	1	1	NR	0	NI	1	0	0	1	1			DE	2
Diethyl ether	237		RTECS No		KI5775000				CAS No		60-29-7					
Di-(2-ethylhexyl) adipate	641	0	2	2	R	4	2	0	0	0	1	1	R		Fp	3
Di-(2-ethylhexyl) adipate	222		RTECS No		AU9700000				CAS No		103-23-1					
Di-(2-ethylhexyl) phosphoric acid	643	(2)	1	1	NR	2	NI	0	1	(2)	2	2			Fp	2

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Di-(2-ethylhexyl) phosphoric acid	223		RTECS No		TB7875000				CAS No		298-07-7					
Di-(2-ethylhexyl) phthalate	642	0	4	4	R	0	0	0	0	1	1	1	R		Fp	3
Di-(2-ethylhexyl) phthalate	2751		RTECS No		TI0350000				CAS No		117-81-7					
Diethyl phthalate	648	3	3	3	R	2	0	0	0	(1)	1	1			S	1
Diethyl phthalate	238		RTECS No		TI1050000				CAS No		84-66-2					
Diethyl sulphate	649	1	NI	1	R	(2)	NI	1	2	3	2	3	CM		SD	3
Diethyl sulphate	239		RTECS No		WS7875000				CAS No		64-67-5					
Diglycidyl ether of Bisphenol A	653	3	NI	3	NR	4	NI	0	0	(2)	1	2	S		S	2
Diglycidyl ether of bisphenol A	250		RTECS No		TX3800000				CAS No		1675-54-3					
Diglycidyl ether of Bisphenol F	728	0	NI	0	NR	3	NI	0	(0)	(2)	1	(2)	SR		S	3
Diglycidyl ether of bisphenol F	251		RTECS No						CAS No		55492-52-9					
Diheptyl phthalate	655	0	(4)	(4)	R	0	NI	0	0	(1)	1	1			Fp	3
Diheptyl phthalate	252		RTECS No		TI1090000				CAS No		3648-21-3					
Di-n-hexyl adipate	656	5	NI	5	(NR)	5	0	0	0	(1)	0	1			FE	1
Di-n-hexyl adipate	224		RTECS No		AV1150000				CAS No		110-33-8					
Di-hexyl phthalate	2125	5	NI	5	R	0	2	0	0	(1)	1	1	R		Fp	3
Dihexyl phthalate	253		RTECS No		TI1100000				CAS No		84-75-3					
1,4-Dihydro-9,10-dihydroxy anthracene disodium salt (soln.)	657	1	NI	1	NI	1	NI	0	NI	NI	NI	NI			D	NI
1,4-Dihydro-9,10-dihydroxyanthracene, disodium salt solution	15		RTECS No						CAS No							
Diisobutene	575	4	4	4	NR	3	NI	0	0	0	1	0			FE	2
Diisobutylene	257		RTECS No		SB2715000				CAS No		11071-47-9					
Diisobutylamine	576	(2)	NI	(2)	(R)	(3)	NI	2	(2)	2	(3)	(3)			FED	3
Diisobutylamine	256		RTECS No		TX1750000				CAS No		110-96-3					
Diisobutyl ketone	579	3	NI	3	R	2	NI	0	0	2	2	2			F	2
Diisobutyl ketone	254		RTECS No		MJ5775000				CAS No		108-83-8					
Diisobutyl phthalate	581	4	(4)	4	R	(4)	1	0	0	1	0	0	R		S	3
Diisobutyl phthalate	255		RTECS No		TI2250000				CAS No		84-69-5					
Diisodecyl phthalate	619	0	0	0	(R)	0	(0)	0	0	(1)	0	1			Fp	2
Diisodecyl phthalate	3119		RTECS No		TI1270000				CAS No		26761-40-0					
Diisoheptyl phthalate	2391	0	(4)	(4)	R	0	0	0	0	(1)	1	1	R		Fp	3

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Diisoheptyl phthalate	3561	RTECS No			CAS No												
Diisononyl adipate	690	0	NI	0	R	0	0	0	0	(1)	1	1				Fp	2
Diisononyl adipate	258	RTECS No			CAS No			33703-08-1									
Diisononyl phthalate	691	0	0	0	R	0	0	0	0	(0)	0	0				Fp	2
Diisononyl phthalate	3120	RTECS No			CAS No												
Diisoctyl phthalate	693	0	4	4	(R)	0	0	0	0	(1)	1	0				Fp	2
Diisoctyl phthalate	259	RTECS No			CAS No			T11300000 27554-26-3									
Diisopropanolamine	703	0	NI	0	NR	1	NI	0	0	0	2	3				FD	3
Diisopropanolamine	260	RTECS No			CAS No			UB6600000 110-97-4									
Diisopropylamine	705	1	NI	1	NR	2	0	1	1	2	3	3				ED	3
Diisopropylamine	261	RTECS No			CAS No			IM4025000 108-18-9									
Diisopropyl benzene (mixed isomers)	2220	5	4	4	NR	4	NI	0	0	2	2	1	(T)	F	2		
Diisopropylbenzene (all isomers)	262	RTECS No			CAS No												
1,3-Diisopropylbenzene	706	5	4	4	NR	4	NI	0	0	2	2	1				F	2
1,3-Diisopropyl benzene	2626	RTECS No			CAS No			CZ6330000 25321-09-9									
Diisopropyl ether	711	1	NI	1	NR	2	NI	0	0	0	1	2				E	2
Isopropyl ether	406	RTECS No			CAS No			TZ5425000 108-20-3									
Diisopropyl naphthalene, mixed isomers	712	5	4	4	NR	3	NI	0	0	(1)	1	1				Fp	2
Diisopropyl naphthalene	263	RTECS No			CAS No			QJ1527000 38640-62-9									
Dimethoxymethane	2405																
Methylal (>=85%)	3662	RTECS No			CAS No												
Dimethyl acetamide	658	0	NI	0	R	1	NI	0	0	2	1	2				D	2
N,N-Dimethylacetamide solution (40% or less)	466	RTECS No			CAS No			AB7700000 127-19-5									
Dimethyl acetamide	658	0	NI	0	R	1	NI	0	0	2	1	2				D	2
N,N-Dimethylacetamide	2730	RTECS No			CAS No			AB7700000 127-19-5									
Dimethyl adipate	659	1	NI	1	(R)	4	NI	0	0	(0)	1	1				SD	2
Dimethyl adipate	264	RTECS No			CAS No			AV1645000 627-93-0									
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	S	NT	DE	3	
Dimethylamine solution (greater than 45% but not greater than 55%)	271	RTECS No			CAS No			IP8750000 124-40-3									
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	S	NT	DE	3	

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Dimethylamine solution (greater than 55% but not greater than 65%)	272	RTECS No			CAS No			IP8750000 124-40-3									
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	S	NT	DE	3	
Dimethylamine solution (45% or less)	270	RTECS No			CAS No			IP8750000 124-40-3									
N,N-Dimethyl cyclohexylamine	665	2	NI	2	NR	2	NI	1	2	3	3C	3				FD	3
N,N-Dimethylcyclohexylamine	467	RTECS No			CAS No			GX1198000 98-94-2									
Dimethyl disulphide	1616	1	NI	1	NR	3	2	2	0	2	1	1				SD	2
Dimethyl disulphide	2504	RTECS No			CAS No			JO1927500 624-92-0									
N,N-Dimethyldodecylamine	2126	3	NI	3	R	4	NI	1	(1)	(3)	3	3				F	3
N,N-Dimethyldodecylamine	468	RTECS No			CAS No			JR6600000 112-18-5									
Dimethylethanolamine	667	0	NI	0	R	2	NI	1	1	2	3	3				D	3
Dimethylethanolamine	273	RTECS No			CAS No			KK6125000 108-01-0									
Dimethyl formamide	676	0	0	0	R	1	0	0	1	2	1	2	R			D	3
Dimethylformamide	274	RTECS No			CAS No			LQ2100000 68-12-2									
Dimethyl glutarate	670	0	NI	0	R	3	NI	0	0	2	3	2	A			SD	3
Dimethyl glutarate	265	RTECS No			CAS No			26717-67-9									
Dimethyl hydrogen phosphite	673	0	NI	0	NR	2	NI	1	0	0	1	1				D	1
Dimethyl hydrogen phosphite	266	RTECS No			CAS No			SZ7710000 868-89-9									
2,2-Dimethyloctanoic acid	675	3	NI	3	R	4	1	0	0	(2)	2	2				Fp	2
Dimethyl octanoic acid	267	RTECS No			CAS No			29662-90-6									
Dimethyl phthalate	678	2	2	2	R	2	0	0	0	(1)	0	1				SD	1
Dimethyl phthalate	268	RTECS No			CAS No			T11575000 131-11-3									
2,2-Dimethylpropane-1,3-diol	679	0	0	0	NR	0	0	0	0	0	2	2				FD	2
2,2-Dimethylpropane-1,3-diol (molten or solution)	29	RTECS No			CAS No			TY5775000 126-30-7									
Dimethyl succinate	681	0	NI	0	NI	2	NI	0	0	0	0	2				SD	2
Dimethyl succinate	269	RTECS No			CAS No			WM7675000 106-65-0									
Dinitrotoluene	688	2	2	2	NR	4	2	2	(2)	(2)	1	0	CMR	S	3		
Dinitrotoluene (molten)	276	RTECS No			CAS No			XT1300000 25321-14-6									
Dinonyl phthalate	689	0	NI	0	R	0	0	0	0	(1)	1	1				Fp	2
Dinonyl phthalate	2993	RTECS No			CAS No			T11800000 84-76-4									
Di-n-octyl phthalate	692	0	(4)	(4)	(R)	0	0	0	0	(1)	1	(1)				Fp	2

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Diocetyl phthalate	277		RTECS No		TI1925000				CAS No		117-84-0					
1,4-Dioxane	682	0	0	0	NR	0	0	0	0	0	0	2	C		D	3
1,4-Dioxane	16		RTECS No		JG8225000				CAS No		123-91-1					
Dipentene	686	4	NI	4	NR	2	NI	0	0	(2)	2	2	S		F	3
Dipentene	278		RTECS No		OS8100000				CAS No		138-86-3					
Diphenyl	694	3	4	4	R	4	1	0	0	(1)	0	1			S	1
Diphenyl	279		RTECS No		DU8050000				CAS No		92-52-4					
Diphenylamine (molten)	2186	3	3	3	NR	3	1	0	0	(1)	1	1			S	1
Diphenylamine (molten)	285		RTECS No						CAS No							
Diphenylamine, reaction product with 2,4,4-trimethylpentene	1500	NI	1	1	NR	3	NI	0	0	(1)	1	1	S		Fp	3
Diphenylamine, reaction product with 2,2,4-Trimethylpentene	286		RTECS No						CAS No							
Diphenylamines, alkylated	1770	5	NI	5	NR	(3)	NI	0	0	(1)	(1)	(1)	S		F	3
Diphenylamines, alkylated	287		RTECS No						CAS No							
Diphenyl/Diphenyl ether (mixtures)	698	NI	NI	4	NR	4	1	0	0	(1)	1	1		(T)	S	1
Diphenyl/Diphenyl ether mixtures	283		RTECS No		DV1500000				CAS No		8004-13-5					
Diphenyl ether	699	4	4	4	NR	4	NI	0	0	0	1	1		T	S	1
Diphenyl ether	281		RTECS No		KN8970000				CAS No		101-84-8					
Diphenyl ether/ Biphenyl phenyl ether mixtures	702	5	NI	5	NR	4	NI	0	0	0	1	1		(T)	S	1
Diphenyl ether/Diphenyl phenyl ether mixture	282		RTECS No						CAS No							
Diphenylmethane-4,4'-diisocyanate (#)	700	5	2	2	NR	0	0	0	0	3	2	2	S		S	3
Diphenylmethane diisocyanate	288		RTECS No		NQ9350000				CAS No		101-68-8					
Diphenylol propane-epichlorohydrin resins	2237	3	NI	3	NR	4	NI	0	0	(2)	1	2			S	2
Diphenylol propane-epichlorohydrin resins	290		RTECS No						CAS No							
Di-n-propylamine	704	1	NI	1	NR	3	NI	2	2	2	3C	3			FED	3
Di-n-propylamine	225		RTECS No		JL9200000				CAS No		142-84-7					
Dipropylene glycol	707	0	1	1	NR	0	NI	0	0	0	1	1			D	1
Dipropylene glycol	291		RTECS No		UB8785000				CAS No		110-98-5					
Dipropylene glycol dibenzoate	708	3	NI	3	R	3	NI	0	0	0	0	0			S	0
Dipropylene glycol dibenzoate	2431		RTECS No		UB8787500				CAS No		94-51-9					
Di-n-propyl phthalate	713	3	NI	3	(R)	3	NI	(0)	(0)	(1)	(1)	(1)	R		S	3

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Di-n-propyl phthalate	2752		RTECS No		TI1940000				CAS No		131-16-8					
Distilled Resin Oil, DRO	2299	(3)	NI	(3)	(NR)	(3)	NI	0	0	(2)	2	1	MN		FE	3
Resin oil, distilled	2958		RTECS No						CAS No							
Dithiocarbamate ester (C7-C35)	2185	NI	2	2	NR	4	NI	0	0	(1)	1	1			S	1
Dithiocarbamate ester (C7-C35)	2371		RTECS No						CAS No							
Ditridecyl adipate	2351	0	NI	0	NR	0	NI	0	0	(2)	2	1	S		Fp	2
Ditridecyl adipate	293		RTECS No						CAS No							
Ditridecyl phthalate	714	0	(0)	0	NR	0	(0)	0	0	(1)	1	(1)			Fp	2
Ditridecyl phthalate	2994		RTECS No		TI1950000				CAS No		119-06-2					
Diundecyl phthalate	715	0	(0)	0	NR	0	0	0	0	(1)	1	1			Fp	2
Diundecyl phthalate	294		RTECS No		TI1980000				CAS No		3648-20-2					
Dodecane	718	5	NI	5	(R)	0	NI	0	0	(1)	(1)	(0)			Fp	2
Dodecane (all isomers)	295		RTECS No		JR2125000				CAS No		112-40-3					
tert-Dodecanethiol	2233	5	NI	5	NR	4	2	0	0	(2)	2	1	S		F	3
tert-Dodecanethiol	2418		RTECS No						CAS No							
1-Dodecanol	719	5	2	2	R	4	1	0	0	(1)	1	(1)			Fp	2
Dodecyl alcohol	298		RTECS No		JR5775000				CAS No		112-53-8					
Dodecene (all isomers)	720	5	NI	5	NR	4	NI	0	0	(2)	2	1	A		F	3
Dodecene (all isomers)	296		RTECS No		UD1950000				CAS No		6842-15-5					
2-Dodeceny succinic acid, dipotassium salt, solution	727	4	NI	4	NR	1	NI	(0)	(0)	NI	NI	NI			D	NI
Dodeceny succinic acid, dipotassium salt solution	297		RTECS No						CAS No		57195-28-5					
Dodecylamine/Tetradecylamine mixture	721	3	NI	3	R	4	NI	1	0	(3)	3	3			F	3
Dodecylamine/Tetradecylamine mixture	303		RTECS No						CAS No							
Dodecyl benzene	126	0	NI	0	NR	0	3	0	0	(2)	(2)	(1)			F	2
Dodecylbenzene	304		RTECS No		CZ9540000				CAS No		123-01-3					
Dodecyl benzene sulphonic acid (contains 1.5% Sulphuric acid)	1739	NI	NI	3	R	3	1	1	(1)	(2)	(1)	(1)			D	2
Alkyl (C11-C17) benzene sulphonic acid	101		RTECS No						CAS No							
Dodecyl diphenyl oxide disulphonate (solns.)	723	(5)	NI	5	NR	4	1	1	0	(3)	1	3			D	3
Dodecyl diphenyl ether disulphonate solution	299		RTECS No		JR8050000				CAS No							
Dodecyl hydroxypropyl sulphide (LOA)	1861	5	NI	5	NI	4	NI	0	0	(0)	0	0			FD	0

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Dodecyl hydroxypropyl sulphide	2252		RTECS No					CAS No									
Dodecyl/octadecyl methacrylate (mixtures)	2116	(5)	NI	(5)	(NR)	(0)	NI	0	0	(1)	1	(1)			Fp	2	
Dodecyl/Octadecyl methacrylate mixture	1717		RTECS No					CAS No									
Dodecyl/pentadecyl methacrylate (mixture)	724	(5)	NI	(5)	(NR)	(0)	NI	0	(0)	(1)	(1)	(1)			Fp	2	
Dodecyl/Pentadecyl methacrylate mixture	302		RTECS No					CAS No									
Dodecyl phenol	725	0	4	4	NI	4	NI	0	0	(3)	3	2			Fp	3	
Dodecyl phenol	301		RTECS No			SL3675000		CAS No			27193-86-8						
Dodecyl-, Tetradecyl-, Hexadecyl-dimethylamine mixture	2248	3	NI	3	R	5	2	1	(1)	(3)	3C	3			F	3	
Alkyl (C12+) dimethylamine	2485		RTECS No					CAS No									
Dodecylxylene	1763	0	NI	0	NI	0	NI	0	0	(1)	1	1			Fp	2	
Dodecyl Xylene	306		RTECS No					CAS No									
Epichlorohydrin	731	0	0	0	R	2	NI	2	2	3	3A	3	CS		D	3	
Epichlorohydrin	309		RTECS No			TX4900000		CAS No			106-89-8						
Ethanol	732	0	NI	0	R	0	NI	0	0	0	1	2			D	2	
Ethyl alcohol	315		RTECS No			KQ6300000		CAS No			64-17-5						
Ethanolamine	733	0	NI	0	R	2	0	1	1	3	3A	3			D	3	
Ethanolamine	311		RTECS No			KJ5775000		CAS No			141-43-5						
Ethanoltriazine (aqueous solution)	2411	(0)	NI	(0)	R	3	NI	1	0	4	0	2	S		D	3	
1,3,5-Hexahydrotriethanol-1,3,5-triazine	3687		RTECS No					CAS No			4719-04-4						
Ethoxylated long chain (>C16)alkyloxyalkanamine (LOA)	2103	5	NI	5	NR	1	NI	0	0	(3)	3	(3)			Fp	3	
Ethoxylated long chain (C16+) alkyloxyalkylamine	2203		RTECS No					CAS No									
Ethoxylated tallow amine (>95%)	2313	0	NI	0	NR	4	NI	1	(1)	3	2	3	S		Fp	3	
Ethoxylated tallow amine (> 95%)	2959		RTECS No					CAS No									
Ethoxylated tallow amine, glycol mixture	2252	2	NI	2	NR	6	NI	1	0	3	2	3	S		D	3	
Ethoxylated tallow amine, glycol mixture	2476		RTECS No					CAS No									
Ethyl acetate	735	0	2	2	R	1	0	0	0	1	0	1			DE	2	
Ethyl acetate	312		RTECS No			AH5425000		CAS No			141-78-6						
Ethyl acetoacetate	736	0	0	0	R	1	NI	0	0	(1)	1	1			D	1	
Ethyl acetoacetate	313		RTECS No			AK5250000		CAS No			141-97-9						
Ethyl acrylate	734	1	NI	1	R	3	1	1	2	2	2	2	SC	T	ED	3	

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Ethyl acrylate	314		RTECS No			AT0700000		CAS No			140-88-5						
Ethylamine	1016	0	NI	0	R	2	NI	2	2	1	3	3			GD	3	
Ethylamine	322		RTECS No			KH2100000		CAS No			75-04-7						
Ethylamine solutions (72% or less)	2219	NI	NI	0	R	2	NI	2	2	1	3	3			DE	3	
Ethylamine solutions (72% or less)	323		RTECS No					CAS No									
Ethyl amyl ketone	1784	2	NI	2	NI	2	NI	0	0	(2)	2	NI			FD	2	
Ethyl amyl ketone	316		RTECS No			RH1485000		CAS No			106-68-3						
Ethylbenzene	740	3	2	2	R	3	(1)	0	0	0	2	2	C		FE	3	
Ethylbenzene	324		RTECS No			DA0700000		CAS No			100-41-4						
N-Ethyl butylamine	745	1	NI	1	NI	NI	NI	1	1	2	3	3			FED	3	
N-Ethylbutylamine	477		RTECS No			EO4880000		CAS No			13360-63-9						
Ethyl tert-butyl ether	2085	1	NI	1	NI	2	NI	0	0	2	2	2			E	2	
Ethyl tert-butyl ether	320		RTECS No			KN4730200		CAS No			637-92-3						
Ethyl butyrate	748	1	NI	1	NI	2	NI	0	0	(2)	2	NI			FED	2	
Ethyl butyrate	317		RTECS No			ET1660000		CAS No			105-54-4						
Ethyl cyclohexane	751	4	4	4	NR	3	NI	(0)	(0)	(1)	(1)	(1)			FE	2	
Ethylcyclohexane	325		RTECS No			GV1140000		CAS No			1678-91-7						
N-Ethyl cyclohexylamine	752	2	NI	2	NI	(3)	NI	1	2	2	3	3			FED	3	
N-Ethylcyclohexylamine	478		RTECS No			GX1225000		CAS No			5459-93-8						
S-Ethyl dipropylthiocarbamate	2081	3	2	2	NI	3	NI	1	1	2	2	(2)	N		F	3	
S-Ethyl dipropylthiocarbamate	2302		RTECS No					CAS No			759-94-4						
Ethylene carbonate	755	0	NI	0	R	0	NI	0	0	(2)	1	2			SD	2	
Ethylene carbonate	326		RTECS No			FF9550000		CAS No			96-49-1						
Ethylene chlorohydrin	756	0	0	0	R	3	NI	2	3	4	2	3			D	3	
Ethylene chlorohydrin	327		RTECS No			KK0875000		CAS No			107-07-3						
Ethylene cyanohydrin	757	0	0	0	NI	2	NI	1	0	(2)	1	2			D	2	
Ethylene cyanohydrin	328		RTECS No			MU5250000		CAS No			109-78-4						
Ethylene diamine	758	0	1	1	R	3	1	1	2	1	3	3	S		D	3	
Ethylendiamine	343		RTECS No			KH8575000		CAS No			107-15-3						
Ethylene diamine, tetra acetic acid, di- and tetra-sodium salt	759	0	NI	0	NR	2	0	1	(1)	(2)	1	2			D	2	

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Ethylenediaminetetraacetic acid, tetrasodium salt solution	344		RTECS No		AH4375000				CAS No		#Error					
Ethylene dibromide	760	1	2	2	NR	3	NI	2	2	2	3	3	CRT		SD	3
Ethylene dibromide	329		RTECS No		KH9275000				CAS No		106-93-4					
Ethylene glycol	761	0	NI	0	R	0	NI	1	(1)	(1)	0	0			D	1
Ethylene glycol	331		RTECS No		KW2975000				CAS No		107-21-1					
Ethylene glycol acrylate	869	0	NI	0	R	4	NI	1	3	3	3	3	SM		D	3
2-Hydroxyethyl acrylate	51		RTECS No		AT1750000				CAS No		818-61-1					
Ethylene glycol butyl ether acetate	764	1	NI	1	R	2	NI	0	1	(1)	1	1			FD	1
Ethylene glycol butyl ether acetate	334		RTECS No		KJ8925000				CAS No		112-07-2					
Ethylene glycol diacetate	765	0	NI	0	NI	2	NI	0	0	(1)	1	NI			D	1
Ethylene glycol diacetate	335		RTECS No		KW4025000				CAS No		111-55-7					
Ethylene glycol ethyl ether acetate	767	0	NI	0	R	2	0	1	0	1	1	2	R		D	3
2-Ethoxyethyl acetate	41		RTECS No		KK8225000				CAS No		111-15-9					
Ethylene glycol methyl butyl ether	772	1	NI	1	NI	1	NI	NI	NI	NI	NI	NI			D	NI
Ethylene glycol methyl butyl ether	336		RTECS No						CAS No		13343-98-1					
Ethylene glycol methyl ether acetate	773	0	NI	0	R	2	NI	0	0	(0)	(1)	1	R		D	3
Ethylene glycol methyl ether acetate	337		RTECS No		KL5950000				CAS No		110-49-6					
Ethylene glycol monoacetate	762	0	NI	0	R	2	NI	0	0	(3)	NI	(3)			D	3
Ethylene glycol acetate	333		RTECS No		KW7175000				CAS No		542-59-6					
Ethylene glycol monoalkyl ethers	2268	0	NI	0	R	2	NI	1	2	2	1	2			D	2
Ethylene glycol monoalkyl ethers	338		RTECS No						CAS No							
Ethylene glycol monoethyl ether	766	0	NI	0	R	0	0	0	0	1	2	2			D	3
2-Ethoxyethanol	40		RTECS No		KK8050000				CAS No		110-80-5					
Ethylene glycol phenyl ether	775	1	NI	1	R	1	0	1	0	(2)	1	2			SD	2
Ethylene glycol phenyl ether	339		RTECS No		KM0350000				CAS No		122-99-6					
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether, mixture	1740	NI	NI	1	R	1	NI	1	0	(2)	(2)	(2)			SD	2
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture	340		RTECS No						CAS No							
Ethylene oxide	77	NI	NI	NI	NI	NI	NI	1	(1)	3	3	3	CMRS		GD	3
Ethylene oxide	2744		RTECS No		KX2450000				CAS No		75-21-8					
Ethylene-propylene copolymer	1508	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)			NI	0

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Propylene-Butylene copolymer	633		RTECS No						CAS No							
Ethylene vinyl acetate copolymer (emulsion)	779	0	1	1	NR	0	0	0	(0)	(2)	2	0			S	2
Ethylene-vinyl acetate copolymer (emulsion)	342		RTECS No						CAS No							
Ethyl 3-ethoxypropionate	1439	1	NI	1	NR	2	NI	0	0	0	1	1			FD	1
Ethyl-3-ethoxypropionate	321		RTECS No		UF3325000				CAS No		763-69-9					
2-Ethylhexanoic acid	776	2	NI	2	R	2	NI	0	0	(2)	2	2			FD	3
2-Ethylhexanoic acid	45		RTECS No		MO7700000				CAS No		149-57-5					
2-Ethylhexyl acrylate	782	3	NI	3	R	2	NI	0	0	(2)	2	2	S		F	3
2-Ethylhexyl acrylate	46		RTECS No		AT0855000				CAS No		103-11-7					
2-Ethylhexyl esters of fatty acids	2221	0	NI	0	R	1	NI	0	(0)	(0)	1	0			F	1
2-Ethyl-2-(hydroxymethyl)propane-1,3-diol C8-C10 ester (LOA)	2054	0	NI	0	R	0	NI	0	(0)	(0)	0	(0)			Fp	2
2-Ethyl-2-(hydroxymethyl)propane-1,3-diol (C8-C10) ester	42		RTECS No						CAS No							
5-Ethylidene-2-norbornene	783	3	3	3	NR	3	0	0	0	2	1	2			FE	2
Ethylidene norbornene	345		RTECS No		RB9450000				CAS No		16219-75-3					
Ethyl isoamyl ketone	737	NI	NI	NI	NI	NI	NI	0	0	(1)	1	(2)			FD	2
Ethyl isoamyl ketone	2618		RTECS No		MJ7350000				CAS No		541-85-5					
Ethyl methacrylate	785	1	NI	1	R	2	0	0	0	0	(2)	(2)	S		FE	2
Ethyl methacrylate	318		RTECS No		OZ4550000				CAS No		97-63-2					
N-Ethyl-2-methylamine	2228	0	NI	0	NR	2	NI	3	2	2	3A	3			D	3
N-Ethylmethylallylamine	2417		RTECS No						CAS No							
o-Ethyl phenol	788	2	NI	2	NI	(2)	NI	1	NI	NI	NI	NI			S	NI
o-Ethylphenol	535		RTECS No		SL4025000				CAS No		90-00-6					
Ethyl propionate	790	1	NI	1	NI	2	0	0	(1)	(2)	2	2			ED	2
Ethyl propionate	319		RTECS No		UF3675000				CAS No		105-37-3					
2-Ethyl-3-propylacrolein	791	2	NI	2	R	3	NI	0	0	1	3	3			F	3
2-Ethyl-3-propylacrolein	43		RTECS No		MP6300000				CAS No		645-62-5					
Ethyl toluene (all isomers)	2297	3	NI	3	NI	(3)	NI	0	0	0	2	2			F	2
Ethyl toluene	346		RTECS No						CAS No							
Fatty acid methyl esters	2362	0	NI	0	R	2	NI	0	(0)	(2)	2	2			Fp	2

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Fatty acid methyl esters (m)	3125	RTECS No			CAS No												
Fatty acids, essentially linear, C6-C18, 2-ethylhexyl ester	2253	0	NI	0	R	1	NI	0	0	(1)	1	0			Fp	2	
Fatty acid (C8-C16) ethyl hexyl esters	2759	RTECS No			CAS No												
Fatty acids, essentially linear, C6-C18, 2-ethylhexyl ester	2253	0	NI	0	R	1	NI	0	0	(1)	1	0			Fp	2	
Fatty acids, essentially linear (C6-C18) 2-ethylhexyl ester	1914	RTECS No			CAS No												
Fatty acids, linear, C8-C18 saturated with C18 unsaturated	2260	(4)	NI	(4)	R	(4)	(1)	(0)	(0)	(1)	(1)	(1)			Fp	3	
Fatty acids, (C8-C18)	2779	RTECS No			CAS No												
Fatty acids, linear C12+ saturated with C12+ unsaturated	2261	5	0	0	(R)	0	NI	(0)	(0)	(1)	(1)	(1)			NI	2	
Fatty acids, (C12+)	2780	RTECS No			CAS No												
Fatty acids saturated, C8-C10	2324	0	NI	0	R	4	NI	0	0	(3)	3C	3			NI	NI	
Fatty acids, (C8-C10)	3079	RTECS No			CAS No												
Fatty acids, unsaturated, linear, C16+	2259	0	0	0	R	(0)	NI	0	0	(0)	0	0			Fp	2	
Fatty acids, (C16+)	2778	RTECS No			CAS No												
Fatty alcohols, linear, (C12+)	2326	(5)	(2)	(2)	(R)	(4)	(1)	0	0	(1)	1	1			Fp	2	
Alcohols (C12+), primary, linear	3081	RTECS No			CAS No												
Fatty alcohols, linear, (C16+)	2327	(5)	(2)	(2)	(R)	(0)	(1)	0	0	(1)	1	1			Fp	2	
Alcohols, linear (C16+)	3082	RTECS No			CAS No												
Ferric chloride	339	Inorg	5	5	Inorg	2	0	1	(0)	(3)	2	3			D	3	
Ferric chloride solutions	348	RTECS No			LJ9100000	CAS No			7705-08-0								
Ferric hydroxyethyl ethylene diamine triacetic acid, tri- sodium salt, solution	796	NI	NI	NI	NI	NI	NI	0	0	(1)	(0)	1			D	1	
Ferric hydroxyethylethylenediaminetriacetic acid, trisodium salt solution	349	RTECS No			CAS No												
Ferric nitrate/nitric acid solution	337	Inorg	(5)	(5)	Inorg	(2)	(0)	0	(0)	(3)	3	3			D	3	
Ferric nitrate/Nitric acid solution	350	RTECS No			CAS No												
Fish oil (containing less than 10% free fatty acids)	2316	0	NI	0	R	2	NI	(0)	(0)	(1)	(0)	(1)			Fp	2	
Fish oil	3046	RTECS No			CAS No												
Fish solubles	1509	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)			NI	NI	
Fish solubles (water-based fish meal extract)	351	RTECS No			CAS No												
Fluorosilicic acid	806	Inorg	0	0	Inorg	2	NI	2	(2)	4	3	3			D	3	
Fluorosilicic acid	2716	RTECS No			VV8225000	CAS No			16961-83-4								
Fluorosilicic acid (20-30%) in water solution	2240	Inorg	0	0	Inorg	2	NI	(1)	(1)	4	3	3			D	3	

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Fluorosilicic acid (20-30%) in water solution	353	RTECS No			CAS No												
Formaldehyde (37%-50% solution)	807	0	NI	0	R	2	NI	2	2	3	3	3	CSM	NT	D	3	
Formaldehyde solutions (45% or less)	354	RTECS No			LP8925000	CAS No			50-00-0								
Formaldehyde, polymer with isobutylenated phenol	2377	NI	NI	NI	NR	NI	NI	NI	NI	NI	NI	NI			Fp	NI	
Formaldehyde, polymer with isobutylenated phenol	1203	RTECS No			CAS No												
Formamide	808	0	NI	0	NR	1	NI	0	0	1	1	2	R		D	3	
Formamide	355	RTECS No			LQ0525000	CAS No			75-12-7								
Formic acid	809	0	NI	0	R	2	NI	1	(1)	2	3C	3			D	3	
Formic acid (85% or less acid)	356	RTECS No			LQ4900000	CAS No			64-18-6								
Formic acid mixture (containing up to 18% propionic acid and up to 25% sodium formate)	2408	0	NI	0	R	1	NI	(0)	(0)	(2)	(2)	(3)			D	3	
Formic acid mixture (containing up to 18% propionic acid and up to 25% sodium formate)	3684	RTECS No			CAS No												
Fumaric adduct of rosin (water dispersion)	810	3	NI	3	NR	3	NI	0	(0)	(3)	0	3	S		D	3	
Fumaric adduct of rosin, water dispersion	357	RTECS No			CAS No			65997-04-8									
Furfural	812	0	NI	0	R	2	1	2	(2)	3	2	2	C		D	3	
Furfural	358	RTECS No			LT7000000	CAS No			98-01-1								
Furfuryl alcohol	813	0	NI	0	R	1	NI	2	2	3	2	2			D	2	
Furfuryl alcohol	359	RTECS No			LU9100000	CAS No			98-00-0								
Glucitol/glycerol blend propoxylated (containing 10% or more amines)	2441	2	NI	2	NR	1	1	1	0	(2)	1	0			D	2	
Glucitol/glycerol blend, propoxylated (containing less than 10% amines)	3762	RTECS No			CAS No												
Glucitol/glycerol blend, propoxylated (containing less than 10% amines)	2368	0	NI	0	NR	1	NI	1	0	(2)	(1)	(1)			SD	2	
Glucitol/glycerol blend propoxylated (containing less than 10% amines)	3074	RTECS No			CAS No												
Glycerine	814	0	NI	0	R	0	0	0	0	(1)	0	1			D	1	
Glycerine	363	RTECS No			MA8050000	CAS No			56-81-5								
Glycerine (83%)/ Dioxane-dimethanol (17%) mixture	1743	NI	NI	NI	R	1	NI	0	(0)	(1)	(0)	1			D	1	
Glycerine (83%), Dioxanedimethanol (17%) mixture	364	RTECS No			CAS No												
Glycerol ethoxylated	2360	0	NI	0	R	0	NI	0	0	(0)	0	0			D	0	
Glycerol ethoxylated	3123	RTECS No			CAS No												
Glycerol monooleate	1898	0	0	0	R	0	NI	0	(0)	(1)	1	1			Fp	2	
Glycerol monooleate	365	RTECS No			RK1300000	CAS No			25496-72-4								
Glycerol propoxylated	2346	0	NI	0	NR	1	NI	1	0	(2)	1	0			D	2	

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Glycerol propoxylated	3110	RTECS No			CAS No											
Glycerol, propoxylated and ethoxylated	2276	0	NI	0	NR	1	0	0	0	0	0	0			SD	2
Glycerol, propoxylated and ethoxylated	2872	RTECS No			CAS No											
Glycerol/sorbitol blend, propoxylated and ethoxylated	2372	0	NI	0	NR	2	NI	NI	NI	NI	NI	NI			NI	NI
Glycerol/sorbitol blend, propoxylated and ethoxylated	3136	RTECS No			CAS No											
Glycerol/sucrose blend, propoxylated and ethoxylated	2361	0	NI	0	NR	1	NI	0	0	0	0	0			SD	0
Glycerol/sucrose blend propoxylated and ethoxylated	3124	RTECS No			CAS No											
Glyceryl triacetate	816	0	NI	0	R	1	0	1	0	0	0	1			D	1
Glyceryl triacetate	367	RTECS No			AK3675000	CAS No			102-76-1							
Glycidyl ester of C10 trialkyl acetic acid	441	3	NI	3	NR	3	NI	0	0	(2)	2	1			F	2
Glycidyl ester of C10 trialkylacetic acid	368	RTECS No			CAS No											
Glycine, Sodium salt, solution	817	0	NI	0	NI	0	NI	0	(0)	(1)	(0)	(1)			D	1
Glycine, sodium salt solution	369	RTECS No			MB7600000	CAS No			56-40-6							
Glycolic acid	2218	0	0	0	R	1	NI	1	(1)	2	3C	3			D	3
Glycolic acid solution (70% or less)	2539	RTECS No			CAS No											
Glyoxal solutions (40% or less)	84	0	NI	0	R	1	NI	0	0	2	2	3	MS		D	3
Glyoxal solution (40% or less)	370	RTECS No			MD2700000	CAS No			107-22-2							
Glyoxylic acid	1535	0	NI	0	R	2	0	0	0	(3)	0	3	S		D	3
Glyoxylic acid solution (50 % or less)	371	RTECS No			MD4550000	CAS No			298-12-4							
Glyphosate solution, without surfactant	1765	0	0	0	NR	3	0	0	0	(3)	0	3			D	3
Glyphosate solution (not containing surfactant)	2204	RTECS No			MC1075000	CAS No			1071-83-6							
Grape Seed Oil	2442	(0)	NI	(0)	(R)	(0)	(0)	(0)	(0)	(1)	(0)	(1)			Fp	2
Grape Seed Oil	3643	RTECS No			CAS No			8024-22-4								
Groundnut oil	820	0	NI	0	R	(2)	NI	(0)	(0)	(0)	0	0			Fp	2
Groundnut oil	2769	RTECS No			RX2830000	CAS No			8002-03-7							
Heptane	827	4	NI	4	R	4	NI	0	0	0	(1)	1	A		E	2
Heptane (all isomers)	372	RTECS No			MI7700000	CAS No			142-82-5							
Heptanoic acid	831	2	NI	2	R	1	NI	0	0	1	3B	(3)			FD	3
n-Heptanoic acid	479	RTECS No			MJ1575000	CAS No			111-14-8							
Heptanol (all isomers)	2223	2	NI	2	R	(2)	NI	0	0	(2)	(1)	(2)			FD	2

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Heptanol (all isomers) (d)	373	RTECS No			CAS No											
1-Heptanol	828	2	NI	2	R	2	0	1	0	2	(2)	(2)			FD	2
1-Heptanol	2688	RTECS No			MK0350000	CAS No			111-70-6							
Heptene (all isomers)	2225	3	NI	3	NI	2	NI	(0)	(0)	(0)	(2)	(1)			E	2
Heptene (all isomers)	374	RTECS No			CAS No											
1-Heptene	832	3	NI	3	NI	2	NI	(0)	(0)	(0)	(2)	(1)			E	2
1-Heptene	2685	RTECS No			MJ8815000	CAS No										
Heptyl acetate	833	3	NI	3	(R)	(3)	NI	0	0	(2)	1	2			F	2
Heptyl acetate	375	RTECS No			AH9901000	CAS No			112-06-1							
Hexadecyl naphthalene/dihexadecyl naphthalene mixture	2159	0	NI	0	NR	0	NI	0	0	(1)	1	1			Fp	2
1-Hexadecyl naphthalene / 1,4-bis(hexadecyl)naphthalene mixture	2373	RTECS No			CAS No											
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	SR		D	3
Hexamethylenediamine	377	RTECS No			MO1180000	CAS No			124-09-4							
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	SR		D	3
Hexamethylenediamine solution	380	RTECS No			MO1180000	CAS No			124-09-4							
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	SR		D	3
Hexamethylenediamine (molten)	378	RTECS No			MO1180000	CAS No			124-09-4							
Hexamethylene diamine adipate, 50% in water	846	0	NI	0	R	1	NI	0	(0)	(0)	0	0			D	0
Hexamethylenediamine adipate (50% in water)	379	RTECS No			AV1940000	CAS No			3323-53-3							
Hexamethylene diisocyanate	2142	3	0	0	NR	2	NI	1	2	4	3	3	S		S	3
Hexamethylene diisocyanate	18	RTECS No			CAS No			822-06-0								
Hexamethylene glycol	847	0	NI	0	R	1	NI	0	0	(1)	0	1			D	1
Hexamethylene glycol	376	RTECS No			MO2100000	CAS No			629-11-8							
Hexamethylenimine	848	1	NI	1	NI	2	NI	3	1	2	2	2			FED	2
Hexamethylenimine	381	RTECS No			CM3150000	CAS No			111-49-9							
Hexamethylene tetramine (40% solution)	849	0	NI	0	R	0	NI	0	0	(1)	0	1	S		D	2
Hexamethylenetetramine solutions	382	RTECS No			MN4725000	CAS No			100-97-0							
Hexane	850	3	NI	3	R	4	NI	0	0	0	2	2	NA		E	2
Hexane (all isomers)	383	RTECS No			MN9275000	CAS No			100-54-3							
Hexane	850	3	NI	3	R	4	NI	0	0	0	2	2	NA		E	2

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Hexane	2683		RTECS No		MN9275000				CAS No		100-54-3					
1,6-Hexanediol, distillation overheads	2143	4	NI	4	NR	2	NI	0	0	2	1	2			FED	2
1,6-Hexanediol, distillation overheads	2641		RTECS No						CAS No							
Hexanoic acid	853	2	NI	2	R	2	NI	0	0	(3)	(3)	3			FD	3
Hexanoic acid	384		RTECS No		MO5250000				CAS No		142-62-1					
1-Hexanol	854	1	0	0	(R)	2	NI	1	0	(3)	1	3			FD	3
Hexanol	385		RTECS No		MQ4025000				CAS No		111-27-3					
Hexene (all isomers)	2224	3	NI	3	R	3	NI	(0)	(0)	(1)	(1)	(1)			E	2
Hexene (all isomers)	386		RTECS No						CAS No							
1-Hexene	855	3	NI	3	R	3	NI	0	0	0	1	1			E	2
1-Hexene	2681		RTECS No		MP6600100				CAS No		592-41-6					
2-Hexene (mixed isomers)	856	3	NI	3	R	3	NI	(0)	(0)	0	(1)	(1)			E	2
2-Hexene (mixed isomers)	2682		RTECS No						CAS No							
Hexyl acetate	857	2	NI	2	NI	3	NI	0	0	(1)	1	1			FE	2
Hexyl acetate	387		RTECS No		AI0875000				CAS No		142-92-7					
sec-Hexyl acetate	858	2	NI	2	NI	3	NI	0	0	0	1	(2)			FED	2
Methylamyl acetate	456		RTECS No		SA7525000				CAS No		108-84-9					
Hexylene glycol	859	0	NI	0	R	0	0	0	0	(3)	2	3			D	2
Hexylene glycol	388		RTECS No		SA0810000				CAS No		107-41-5					
Hydrocarbon waxes	2278	0	NI	0	NR	0	0	0	0	(0)	1	1			Fp	2
Hydrocarbon waxes	2886		RTECS No						CAS No							
Hydrochloric acid	864	Inorg	0	0	Inorg	1	NI	1	1	3	3C	3			DE	3
Hydrochloric acid	389		RTECS No		MW4025000				CAS No		7647-01-0					
Hydrogenated Starch Hydrolysate	2347	0	NI	0	R	0	NI	0	0	(0)	0	0			D	0
Hydrogenated starch hydrolysate	3077		RTECS No						CAS No							
Hydrogen peroxide, more than 60%	867	Inorg	0	0	Inorg	3	NI	1	0	2	3	3			D	3
Hydrogen peroxide, more than 60%	2689		RTECS No		MX0900000				CAS No		7722-84-1					
Hydrogen peroxide, more than 60%	867	Inorg	0	0	Inorg	3	NI	1	0	2	3	3			D	3
Hydrogen peroxide solutions (over 60% but not over 70% by mass)	390		RTECS No		MX0900000				CAS No		7722-84-1					
Hydrogen peroxide, more than 8% but not more than 60%	2231	Inorg	0	0	Inorg	3	NI	1	0	(2)	3	3			D	3

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Hydrogen peroxide solutions (over 8% but not over 60% by mass)	391		RTECS No						CAS No							
Hydrogen peroxide, more than 8% but not more than 60%	2231	Inorg	0	0	Inorg	3	NI	1	0	(2)	3	3			D	3
Hydrogen peroxide, more than 8% but not more than 60%	2690		RTECS No						CAS No							
N-(2-Hydroxyethyl) ethylene diamine triacetic acid, trisodium salt (solution)	870	0	NI	0	NI	1	NI	0	0	(1)	1	1	R		D	3
N-(Hydroxyethyl)ethylenediaminetriacetic acid, trisodium salt solution	470		RTECS No		MB9185000				CAS No		150-30-0					
2-Hydroxy-4-(methylthio) butanoic acid	871	1	NI	1	R	1	NI	0	0	(3)	1	3			D	3
2-Hydroxy-4-(methylthio)butanoic acid	49		RTECS No		ET4761500				CAS No		583-91-5					
Icosa(oxypropane-2,3-diyl)s	2092	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)			Fp	2
Icosa(oxypropane-2,3-diyl)s	392		RTECS No						CAS No							
Icosa(oxypropane-2,3-diyl)s	2092	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)			Fp	2
Icosa(oxypropane-2,3-diyl)s	2691		RTECS No						CAS No							
Illipe oil (containing less than 10% free fatty acids)	2304	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Illipe oil	3034		RTECS No						CAS No							
Interesterified Mixed Vegetable Oils	2355	0	NI	0	R	(0)	NI	(0)	(0)	(1)	(1)	(1)			Fp	2
Interesterified vegetable oils	3115		RTECS No						CAS No							
Isobutanol	382	0	NI	0	R	1	0	0	0	1	2	3			D	3
Isobutyl alcohol	397		RTECS No		NP9625000				CAS No		78-83-1					
Isobutyl formate	405	1	NI	1	NI	1	NI	0	(0)	0	(1)	(2)			E	2
Isobutyl formate	398		RTECS No		LQ8650000				CAS No		542-55-2					
Isobutyl methacrylate	408	2	NI	2	NR	1	NI	0	0	0	2	2	S		FED	2
Isobutyl methacrylate	2673		RTECS No		OZ4900000				CAS No		97-86-9					
Isobutyric acid	419	0	NI	0	R	2	NI	2	2	(3)	3	3			E	NI
Isobutyric acid	2459		RTECS No		NQ4375000				CAS No		79-31-2					
Isodecanol	557	3	2	2	R	3	NI	0	0	0	2	1			Fp	2
Decyl alcohol (all isomers)	219		RTECS No		NR0960000				CAS No		25339-17-7					
Isononanol	1059	3	NI	3	NR	3	1	0	0	(2)	2	2			Fp	2
Nonyl alcohol (all isomers)	510		RTECS No		RH1400000				CAS No		2430-22-0					
Isononylaldehyde	2300	3	NI	3	NR	(3)	NI	0	0	(2)	2	1			F	2
Isononylaldehyde	2754		RTECS No						CAS No							
Isooctaldehyde	1071	2	NI	2	NI	3	NI	0	0	(1)	1	1			F	1

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Octyl aldehydes	542	RTECS No			CAS No			63885-09-6										
Isooctanol	1076	3	NI	3	R	2	0	1	0	(2)	2	(2)				F	2	
iso-Octanol	2675	RTECS No			NS7700000			CAS No			26952-21-6							
Isooctylamine	1081	2	NI	2	NI	3	NI	1	1	3	3	3				FD	3	
2-Ethylhexylamine	48	RTECS No			MQ5250000			CAS No			104-75-6							
Isopentene	1113	2	NI	2	NI	2	NI	(0)	(0)	(0)	(1)	(1)				E	2	
iso-Pentene	2677	RTECS No			EM7600000			CAS No			563-45-1							
Isophorone	879	1	1	1	R	2	0	1	1	(2)	1	2				FD	2	
Isophorone	399	RTECS No			GW7700000			CAS No			78-59-1							
Isophorone diamine	880	0	0	0	NR	2	0	1	(1)	(3)	3	3	S				D	3
Isophoronediamine	401	RTECS No			GV6129000			CAS No			2855-13-2							
Isophorone diisocyanate	881	1	NI	1	NR	3	NI	0	0	3	3	3	SA				S	3
Isophorone diisocyanate	400	RTECS No			NQ9370000			CAS No			4098-71-9							
Isoprene	882	2	2	2	NR	2	NI	0	0	0	1	2	CM				E	3
Isoprene	402	RTECS No			NT4037000			CAS No			78-79-5							
Isopropanol	1181	0	NI	0	R	0	0	0	0	0	1	2				D	2	
Isopropyl alcohol	405	RTECS No			NT8050000			CAS No			67-63-0							
Isopropanolamine	1182	0	NI	0	R	2	NI	0	1	0	3	3				D	3	
Isopropanolamine	403	RTECS No			UA5775000			CAS No			78-96-6							
Isopropyl acetate	1192	1	NI	1	R	1	NI	0	0	0	1	2				ED	2	
Isopropyl acetate	404	RTECS No			AI4930000			CAS No			108-21-4							
Isopropylamine	1195	0	NI	0	R	2	NI	2	2	1	3	3				DE	3	
Isopropylamine	407	RTECS No			NT8400000			CAS No			75-31-0							
Isopropylamine (70%)	2350	0	NI	0	R	2	NI	2	2	1	3	3				DE	3	
Isopropylamine (70% or less) solution	395	RTECS No			CAS No													
Isopropyl benzene	1197	3	2	2	R	3	NI	0	0	0	2	1				FE	2	
Propylbenzene (all isomers)	623	RTECS No			GR8575000			CAS No			98-82-8							
Isopropyl benzene	1197	3	2	2	R	3	NI	0	0	0	2	1				FE	2	
Isopropylbenzene	2687	RTECS No			GR8575000			CAS No			98-82-8							
Isopropyl cyclohexane	1199	4	NI	4	(NR)	(3)	NI	(0)	(0)	(1)	(0)	(1)				FE	2	

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Isopropylcyclohexane	408	RTECS No			CAS No			696-29-7										
Isopropyltoluenes	549	4	4	4	(NR)	3	NI	0	(0)	1	2	(1)				FE	2	
p-Cymene	552	RTECS No			GZ5950000			CAS No			99-87-6							
Isovaleraldehyde	1390	1	NI	1	R	3	NI	0	0	0	2	2				D	2	
Valeraldehyde (all isomers)	731	RTECS No			ES3450000			CAS No			590-86-3							
Jatropha oil	2402	0	NI	(0)	(R)	(2)	NI	(0)	(0)	(0)	(0)	(0)				Fp	2	
Jatropha oil	3637	RTECS No			CAS No													
Kaolin slurry	883	Inorg	NI	0	Inorg	0	NI	0	0	0	0	0				S	0	
Kaolin slurry	409	RTECS No			GF1670500			CAS No			1332-58-7							
Lactic acid	886	0	NI	0	R	1	NI	0	0	(3)	2	3				D	3	
Lactic acid	410	RTECS No			OD2800000			CAS No			50-21-5							
Lactonitrile solution (80% or less)	887	0	NI	0	R	4	NI	3	4	(4)	NI	NI				D	3	
Lactonitrile solution (80% or less)	411	RTECS No			OD8225000			CAS No			78-97-7							
Lard (containing less than 10% free fatty acids)	2317	0	NI	0	R	0	NI	0	(0)	(1)	0	1				Fp	2	
Lard	3047	RTECS No			CAS No													
Latex, ammonia inhibited	889	0	NI	0	NI	(2)	NI	0	0	(1)	0	1				D	1	
Latex, ammonia (1% or less)- inhibited	413	RTECS No			CAS No													
Lauric acid	891	4	NI	4	R	4	1	0	(0)	(2)	1	2				Fp	2	
Lauric acid	415	RTECS No			OE9800000			CAS No			143-07-7							
Lauryl methacrylate	893	0	2	2	R	0	0	0	(0)	(1)	1	1				F	1	
Dodecyl methacrylate	300	RTECS No			OZ4300000			CAS No			142-90-5							
Lecithin (soybeans)	2146	0	NI	0	R	0	NI	0	0	(0)	0	(0)				SD	0	
Lecithin	417	RTECS No			CAS No													
Lignin sulphonic acid, salt solution	34	0	NI	0	(NR)	(0)	NI	0	(0)	(0)	(0)	(0)				D	0	
Ligninsulphonic acid, sodium salt solution	419	RTECS No			CAS No													
Linear alkyl (C12-16) propoxyamine ethoxylate	2380	3	0	3	NR	4	NI	1	(1)	(3)	3	(3)	S				D	3
Alkyl(C12-C16) propoxyamine ethoxylate	3423	RTECS No			CAS No													
Linseed oil (containing less than 4% free fatty acids)	2318	0	NI	0	R	(2)	NI	0	(0)	(1)	0	(1)				Fp	2	
Linseed oil	3048	RTECS No			CAS No													
Long chain alkaryl polyether (C11-C20) (LOA)	1982	(4)	NI	(4)	NR	3	(1)	0	0	(2)	0	2				Fp	2	

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Long-chain alkaryl polyether (C11-C20)	421	RTECS No			CAS No													
Long chain alkaryl sulphonic acid (C16-C60) (LOA)	1966	0	NI	0	(NR)	0	NI	0	0	(2)	(1)	2				Fp	2	
Long-chain alkaryl sulphonic acid (C16-C60)	424	RTECS No			CAS No													
Long-chain alkylphenate/Phenol sulphide mixture	1754	(0)	NI	(0)	(NR)	0	NI	0	0	(2)	2	2	S				Fp	3
Long-chain alkylphenate/Phenol sulphide mixture	425	RTECS No			CAS No													
Long-chain polyetheramine in alkyl(C2-C4)benzenes	1457	NI	NI	NI	NR	2	NI	0	0	(2)	2	2				Fp	2	
	422	RTECS No			CAS No													
Lubrizol polyolefin anhydride	1865	0	NI	0	NR	1	NI	0	0	(2)	1	(2)				Fp	2	
Polyolefin anhydride	605	RTECS No			CAS No													
L-Lysine solution (50% or less)	2199	0	0	0	R	1	0	0	0	0	1	NI				D	1	
L-Lysine solution (60% or less)	2306	RTECS No			CAS No													
Magnesium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	71	(0)	NI	(0)	NR	(2)	NI	0	0	(1)	(1)	(1)	S				S	2
Magnesium long-chain alkyl salicylate (C11+)	429	RTECS No			CAS No													
Magnesium chloride	915	Inorg	0	0	Inorg	1	0	0	0	(0)	0	0				D	0	
Magnesium chloride solution	427	RTECS No			OM2800000	CAS No			7786-30-3									
Magnesium hydroxide slurry	916	Inorg	0	0	Inorg	0	NI	0	0	(1)	(0)	1				S	1	
Magnesium hydroxide slurry	428	RTECS No			OM3570000	CAS No			1309-42-8									
Magnesium lignosulphonate solutions	2356	(0)	NI	(0)	(NR)	(0)	NI	0	0	(0)	(0)	(0)				D	0	
Ligninsulphonic acid, magnesium salt solution	3116	RTECS No			CAS No													
Magnesium long chain alkaryl sulphonate (C11-C50) (LOA)	1967	0	NI	0	NR	0	NI	0	0	(2)	1	2	S				Fp	3
Magnesium long-chain alkaryl sulphonate (C11-C50)	430	RTECS No			CAS No													
Maleic acid/allyl sulfonic acid copolymer with phosphonate groups, partial sodium salt (aqueous solution)	2412	0	NI	0	NR	0	NI	(0)	(0)	(0)	(0)	(0)				D	0	
Maleic acid/allyl sulfonic acid copolymer, containing carboxylate, phosphonate & sulfonate groups, partial sodium salt	3688	RTECS No			CAS No													
Maleic anhydride	921	1	NI	1	R	2	0	1	2	(3)	3	3	S				D	3
Maleic anhydride	431	RTECS No			ON3675000	CAS No			108-31-6									
Maleic anhydride - sodium allylsulfonate copolymer(aqueous solution)	2410	0	NI	0	NR	1	NI	0	0	(0)	(0)	0				D	0	
Maleic anhydride-sodium allylsulfonate copolymer solution	3686	RTECS No			CAS No													
Maltitol Syrup	2348	0	NI	0	R	0	NI	0	0	(0)	0	0				D	0	
Maltitol solution	3078	RTECS No			CAS No													

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Mango kernal oil (containing less than 10% free fatty acids)	2305	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)				Fp	2	
Mango kernel oil	3035	RTECS No			CAS No													
2-Mercaptobenzothiazol	925	2	1	1	NR	4	2	0	0	(0)	0	0	S				S	2
Mercaptobenzothiazol, sodium salt solution	432	RTECS No			DL6475000	CAS No			149-30-4									
Mesityl oxide	946	1	NI	1	R	(1)	NI	1	0	2	2	2				D	2	
Mesityl oxide	433	RTECS No			SB4200000	CAS No			141-79-7									
Metam-sodium (ISO)	202	0	NI	0	NR	4	NI	1	2	(2)	2	1	S				D	2
Metam sodium solution	434	RTECS No			FC2100000	CAS No			137-42-8									
Methacrylic acid-alkoxypoly (alkylene oxide) methacrylate co-polymer sodium salt (45% or less solution)	2288	NI	0	0	NR	1	NI	0	(0)	(1)	1	0				D	1	
Methacrylic acid - alkoxypoly (alkylene oxide) methacrylate copolymer, sodium salt aqueous solution (45% or less)	2819	RTECS No			CAS No													
Methacrylic acid, inhibited	948	0	NI	0	R	2	0	1	2	2	3	3				D	3	
Methacrylic acid	435	RTECS No			OZ2975000	CAS No			79-41-4									
Methacrylic resin in 1,2 Dichloroethane soln.	2046	1	1	1	NR	2	0	(1)	(0)	(2)	(1)	(2)	C				SD	3
Methacrylic resin in ethylene dichloride	436	RTECS No			CAS No													
Methacrylonitrile	949	0	NI	0	R	2	0	2	2	3	1	1	S	NT			ED	3
Methacrylonitrile	437	RTECS No			UD1400000	CAS No			126-98-7									
Methanol	951	0	NI	0	R	0	0	(2)	(2)	(2)	2	2	T				DE	3
Methyl alcohol	441	RTECS No			PC1400000	CAS No			67-56-1									
(2-Methoxymethylethoxy)propanols	2452	0	NI	0	R	0	(0)	0	0	(0)	0	0				D	0	
	3870	RTECS No			CAS No													
Methyl acetate	954	0	NI	0	R	1	NI	0	0	0	1	2				DE	2	
Methyl acetate	438	RTECS No			AI9100000	CAS No			79-20-9									
Methyl acetoacetate	335	0	NI	0	R	1	NI	0	0	(2)	1	2				D	2	
Methyl acetoacetate	439	RTECS No			AK5775000	CAS No			105-45-3									
Methyl acrylate	955	0	NI	0	R	3	NI	1	1	2	2	3	MS				D	3
Methyl acrylate	440	RTECS No			AT2800000	CAS No			96-33-3									
Methylamine solution 42% or less	957	0	NI	0	R	2	NI	2	(2)	3	3	3	M	NT			DE	3
Methylamine solutions (42% or less)	455	RTECS No			PF6300000	CAS No			74-89-5									
Methyl amyl alcohol	958	1	NI	1	R	1	NI	1	0	2	1	3				FED	3	
Methylamyl alcohol	457	RTECS No			SA7350000	CAS No			108-11-2									

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Methyl amyl ketone	959	1	NI	1	NI	1	NI	1	0	0	1	1			FED	2
Methyl amyl ketone	442		RTECS No		MJ5075000				CAS No		110-43-0					
N-Methyl aniline	961	1	NI	1	(NR)	3	1	1	1	(2)	(1)	1			FD	2
N-Methylaniline	3107		RTECS No		BY4550000				CAS No		100-61-8					
alpha-Methylbenzyl alcohol with acetophenone (15% or less)	2399	1	NI	1	(R)	(1)	NI	(1)	(0)	(3)	(2)	(3)	R		Fp	3
alpha-Methylbenzyl alcohol with acetophenone (15% or less)	3634		RTECS No						CAS No		98-85-1					
2-Methyl-2-butanol	964	1	1	1	(R)	(1)	0	1	1	1	3	2			D	3
tert-Amyl alcohol	685		RTECS No		SC0175000				CAS No		75-85-4					
3-Methyl-1-butanol	965	1	1	1	(R)	1	0	1	0	(2)	2	2			FED	2
Isoamyl alcohol	396		RTECS No		EL5425000				CAS No		123-51-3					
3-Methyl-1-butanol	965	1	1	1	(R)	1	0	1	0	(2)	2	2			FED	2
Amyl alcohol, primary	126		RTECS No		EL5425000				CAS No		123-51-3					
Methyl butenol	967	0	NI	0	R	2	NI	1	0	(2)	2	2			D	2
Methylbutenol	458		RTECS No		EM9472500				CAS No		556-82-1					
Methyl tert-butyl ether	969	1	NI	1	NR	1	0	0	0	0	2	1		T	ED	2
Methyl tert-butyl ether	454		RTECS No		KN5250000				CAS No		1634-04-4					
Methyl butyl ketone	970	1	NI	1	(R)	1	(0)	0	0	0	1	1	RN		FED	3
Methyl butyl ketone	443		RTECS No		MP1400000				CAS No		591-78-6					
Methylbutynol	968	0	NI	0	NR	1	NI	1	1	0	0	2			D	2
2-Methyl-2-hydroxy-3-butyne	52		RTECS No		ES0810000				CAS No		115-19-5					
Methylbutynol	968	0	NI	0	NR	1	NI	1	1	0	0	2			D	2
Methylbutynol	459		RTECS No		ES0810000				CAS No		115-19-5					
Methyl butyrate	973	1	NI	1	NI	(2)	NI	0	0	2	2	(2)			ED	2
Methyl butyrate	444		RTECS No		ET5500000				CAS No		623-42-7					
Methyl cyclohexane	976	3	3	3	NR	3	1	0	0	1	1	1	A		E	2
Methylcyclohexane	460		RTECS No		GV6125000				CAS No		108-87-2					
Methyl cyclopentadiene, dimer	977	4	NI	4	(NR)	(3)	NI	0	(0)	(2)	(2)	(2)			F	2
Methylcyclopentadiene dimer	461		RTECS No		PC1075000				CAS No		26472-00-4					
Methyl cyclopentadienyl manganese tricarbonyl (60-70%) in mineral oil	2213	3	NI	3	NR	4	NI	2	3	4	1	1			S	3
Methylcyclopentadienyl manganese tricarbonyl	2692		RTECS No						CAS No							

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N-Methyldiethanolamine	1491	0	NI	0	R	2	NI	1	0	(2)	1	2			D	2
Methyl diethanolamine	445		RTECS No		KL7525000				CAS No		105-59-9					
Methylene dithiocyanate	2235	2	NI	2	NR	5	NI	2	0	4	3	3	S		NI	3
Methylene bithiocyanate	2693		RTECS No						CAS No		6317-18-6					
2-Methyl-6-ethylaniline	984	2	NI	2	NR	2	NI	1	1	(2)	0	2			FD	2
2-Methyl-6-ethyl aniline	54		RTECS No		BY5600000				CAS No		24549-06-2					
2-Methyl-5-ethylpyridine	986	2	NI	2	R	2	0	1	2	(3)	3	3			FD	3
2-Methyl-5-ethyl pyridine	53		RTECS No		TJ6825000				CAS No		104-90-5					
Methyl formate	987	0	NI	0	R	1	NI	1	0	2	0	2			DE	2
Methyl formate	447		RTECS No		LQ8925000				CAS No		107-31-3					
N-Methylglucamine, 60% aqueous solution	2048	0	NI	0	R	0	NI	1	0	(3)	0	3			D	3
N-Methylglucamine solution (70% or less)	482		RTECS No		000000000				CAS No		6284-40-8					
2-Methylglutaronitrile with 2-Ethylsuccinonitrile (12% or less)	2397	0	NI	0	R	0	NI	2	2	3	0	1			FD	2
2-Methylglutaronitrile with 2-Ethylsuccinonitrile (12% or less)	3632		RTECS No						CAS No		4553-62-2					
Methyl heptyl ketone	988	3	NI	3	R	3	NI	0	0	NI	NI	NI			FED	NI
Methyl heptyl ketone	448		RTECS No		RA8225000				CAS No		821-55-6					
Methyl isobutyl ketone	971	1	NI	1	R	1	0	1	0	2	2	3			FED	3
Methyl isobutyl ketone	449		RTECS No		SA9275000				CAS No		108-10-1					
Methyl methacrylate	995	1	NI	1	R	2	NI	0	0	0	2	2	S		ED	2
Methyl methacrylate	450		RTECS No		OZ5075000				CAS No		80-62-6					
3-Methyl-3-methoxy butanol	996	1	NI	1	NR	0	NI	0	(0)	(2)	1	(2)			FD	2
3-Methyl-3-methoxybutanol	59		RTECS No						CAS No							
3-Methyl-3-methoxybutyl acetate	997	1	NI	1	NR	0	NI	0	(0)	NI	NI	NI			F	NI
3-Methyl-3-methoxybutyl acetate	60		RTECS No						CAS No							
Methyl naphthalenes	1999	4	NI	4	(NR)	(4)	NI	1	0	(2)	1	1		T	F	2
Methyl naphthalene (molten)	451		RTECS No						CAS No							
2-Methyl pentane	1000	3	NI	3	NI	4	NI	(0)	(0)	(2)	(2)	(2)			E	2
2-Methylpentane	2684		RTECS No		SA2995000				CAS No		107-83-5					
2-Methyl-1,3-propanediol	2200	0	0	0	NR	0	0	0	0	(0)	0	0			D	0
2-Methyl-1,3-propanediol	2213		RTECS No						CAS No							

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Methyl propyl ketone	1003	0	NI	0	(R)	0	NI	1	0	(2)	1	2				FED	2
Methyl propyl ketone	452		RTECS No		SA7875000				CAS No		107-87-9						
2-Methyl pyridine	1005	1	NI	1	R	1	NI	1	2	1	3A	3				D	3
2-Methylpyridine	55		RTECS No		TJ4900000				CAS No		109-06-8						
3-Methylpyridine	1006	1	NI	1	R	1	NI	1	2	2	3	3				D	3
3-Methylpyridine	61		RTECS No		TJ5000000				CAS No		108-99-6						
4-Methylpyridine	1007	1	NI	1	(R)	1	NI	1	2	2	3	3				D	3
4-Methylpyridine	63		RTECS No		UT5425000				CAS No		108-89-4						
N-Methylpyrrolidone	1008	0	NI	0	R	1	NI	0	0	2	1	2	R			D	3
N-Methyl-2-pyrrolidone	481		RTECS No		UY5790000				CAS No		872-50-4						
Methyl salicylate	86	2	NI	2	R	2	NI	1	1	(2)	2	1	R			SD	3
Methyl salicylate	453		RTECS No		VO4725000				CAS No		119-36-8						
alpha-Methylstyrene	1010	3	3	3	NR	3	NI	0	0	1	2	1	M	(T)		FE	3
alpha-Methylstyrene	107		RTECS No		WL5075300				CAS No		98-83-9						
3-(Methylthio) propionaldehyde	993	0	NI	0	R	3	1	1	1	2	2	3	NS	T		D	3
3-(methylthio)propionaldehyde	2368		RTECS No		UE2285000				CAS No		3268-49-3						
Metolachlor (ISO)	113	2	2	2	NR	5	1	1	0	(2)	1	0	S			S	2
N-(2-Methoxy-1-methyl ethyl)-2-ethyl-6-methyl chloroacetanilide	469		RTECS No		AN3430000				CAS No		51218-45-2						
Mixed acid oil	2306	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	(1)	1				Fp	2
Acid oil mixture from soybean, corn (maize) and sunflower oil refining	3036		RTECS No						CAS No								
Mixture of dithiophosphate salts in water	2381	1	0	1	NR	2	NI	0	0	(2)	2	2				D	2
Dialkyl thiophosphates sodium salts solution	3424		RTECS No						CAS No								
Molasses	1013	0	NI	0	R	0	NI	0	0	0	0	0				D	0
Molasses	462		RTECS No						CAS No								
Molybdenum polysulfide long chain alkyl dithiocarbamide complex	2344	4	2	2	NR	2	0	0	0	(2)	2	2				Fp	2
Molybdenum polysulfide long chain alkyl dithiocarbamide complex	3108		RTECS No						CAS No								
Mononitrobenzene	1017	1	1	1	R	3	(4)	(2)	2	2	1	1	CRT			SD	3
Nitrobenzene	501		RTECS No		DA6475000				CAS No		98-95-3						
Morpholine	1018	0	0	0	R	2	NI	1	2	2	3	3				D	3
Morpholine	463		RTECS No		QD6475000				CAS No		110-91-8						

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Myrcene	1019	4	NI	4	R	4	1	0	0	(2)	2	NI				F	2
Myrcene	465		RTECS No		RG5365000				CAS No		123-35-3						
Naphthalene	1	3	3	3	NR	4	1	1	0	(2)	1	1	C	T		S	3
Naphthalene (molten)	493		RTECS No		QJ0525000				CAS No		91-20-3						
Naphthalene sulphonic acid condensed with formaldehyde, sodium salt, solution	1020	0	1	1	(NR)	1	NI	0	(0)	(1)	0	1				D	1
Naphthalenesulphonic acid-Formaldehyde copolymer, sodium salt solution	494		RTECS No		EC4850000				CAS No		9084-06-4						
Neodecanoic acid	1025	4	NI	4	NR	2	NI	0	0	(2)	0	2				Fp	2
Neodecanoic acid	496		RTECS No						CAS No		26896-20-8						
Nitric acid (90% or less)	1029	Inorg	NI	0	Inorg	2	NI	(3)	(1)	3	3C	3				D	3
Nitric acid (less than 70%)	499		RTECS No		QU5775000				CAS No		7697-37-2						
Nitric acid (90% or less)	1029	Inorg	NI	0	Inorg	2	NI	(3)	(1)	3	3C	3				D	3
Nitric acid (70% and over)	498		RTECS No		QU5775000				CAS No		7697-37-2						
Nitrilotriacetic acid, trisodium salt	1030	0	NI	0	R	1	0	1	(0)	0	1	1	CMR			D	3
Nitrilotriacetic acid, trisodium salt solution	500		RTECS No		MB8400000				CAS No		5094-31-3						
Nitroethane	1037	0	NI	0	NR	2	NI	1	0	(2)	(0)	(1)				SD	2
Nitroethane	502		RTECS No		KI5600000				CAS No		79-24-3						
Nitroethane (80%)/Nitropropane (20%)	2245	0	1	1	NR	2	NI	1	1	2	0	1				E	2
Nitroethane(80%)/ Nitropropane(20%)	503		RTECS No						CAS No								
Nitroethane, 1-Nitropropane (each 15% or more) mixture	2270	(0)	(1)	(1)	(NR)	(2)	NI	1	1	2	0	1				FED	2
Nitroethane, 1-Nitropropane (each 15% or more) mixture	2212		RTECS No						CAS No								
2-Nitrophenol	1041	1	2	2	R	3	(2)	0	0	(1)	1	1				S	1
o-Nitrophenol (molten)	536		RTECS No		SM2100000				CAS No		88-75-5						
1-Nitropropane	1044	0	1	1	NR	1	NI	1	0	2	0	1				FED	2
1-Nitropropane	2747		RTECS No		TZ5075000				CAS No		108-03-2						
1- or 2- Nitropropane	2242	0	1	1	NR	1	NI	2	0	2	0	1	C			FED	3
1- or 2-Nitropropane	20		RTECS No						CAS No								
2-Nitropropane	1045	0	1	1	NR	2	NI	2	0	2	0	0	C			FED	3
2-Nitropropane	2748		RTECS No		TZ5250000				CAS No		79-46-9						
Nitropropane (60%) Nitroethane (40%) (mixture)	1046	0	1	1	NR	2	NI	1	0	2	0	1	C			FED	3
Nitropropane (60%)/Nitroethane (40%) mixture	504		RTECS No						CAS No								

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o-Nitrotoluene	1049	2	2	2	NR	2	(1)	1	0	(2)	0	1	CMR		S	3
o-Nitrotoluene	2745	RTECS No			XT3150000	CAS No			88-72-2							
p-Nitrotoluene	1051	2	1	1	NR	3	0	1	0	(2)	0	1	R		S	3
p-Nitrotoluene	2746	RTECS No			XT3325000	CAS No			99-99-0							
o- or p-Nitrotoluenes	2241	2	2	2	NR	3	(1)	1	0	(2)	0	1	CMR		S	3
o- or p-Nitrotoluenes	532	RTECS No				CAS No										
Nonane	1054	4	NI	4	R	4	NI	0	0	1	1	1	A		FE	2
Nonane (all isomers)	506	RTECS No			RA6115000	CAS No			111-84-2							
Nonanoic acid	1055	3	NI	3	R	2	NI	0	0	(3)	2	3			F	3
Nonanoic acid (all isomers)	507	RTECS No			RA6650000	CAS No			112-05-0							
Nonene (all isomers)	2222	4	NI	4	NI	3	NI	0	0	0	1	1	A		FE	2
Nonene (all isomers)	508	RTECS No				CAS No										
1-Nonene	1060	4	NI	4	NI	3	NI	0	0	0	1	1	A		FE	2
1-Nonene	2680	RTECS No				CAS No			27215-95-8							
Nonyl acetate	1766	4	NI	4	NI	NI	NI	0	0	NI	NI	NI			F	NI
Nonyl acetate	509	RTECS No				CAS No			143-13-5							
Nonyl methacrylate monomer	1061	5	NI	5	R	3	NI	(0)	(0)	(1)	(1)	(1)			F	1
Nonyl methacrylate monomer	511	RTECS No				CAS No			2696-43-7							
Nonyl phenol	1062	5	4	4	NR	5	3	1	0	(3)	3	3			Fp	3
Nonylphenol	512	RTECS No			SM5600000	CAS No			25154-52-3							
Nonyl(C6-C12)phenol poly(4-12)ethoxylate	1063	4	NI	4	NR	3	1	0	0	(2)	2	1			D	2
Nonylphenol poly(4+)ethoxylate	513	RTECS No				CAS No										
Nonyl(C6-C12)phenol poly(4-12)ethoxylate	1063	4	NI	4	NR	3	1	0	0	(2)	2	1			D	2
Alkyl(C7-C11)phenol poly(4-12)ethoxylate	97	RTECS No				CAS No										
Octamethylcyclotetrasiloxane	2398	5	5	5	NR	0	3	0	0	0	0	0			F	1
Octamethylcyclotetrasiloxane	3633	RTECS No				CAS No										
Octane	1072	5	NI	5	(R)	4	NI	(0)	(0)	0	0	0	A		FE	2
Octane (all isomers)	538	RTECS No			RG8400000	CAS No			111-65-9							
Octanoic acid (Caprylic acid)	1074	3	NI	3	R	1	NI	0	0	(3)	3	3			F	3
Octanoic acid (all isomers)	539	RTECS No			RH0175000	CAS No			134-07-2							

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1-Octanol	1075	3	NI	3	R	2	0	1	0	(2)	2	2			Fp	2
1-Octanol	2676	RTECS No			RH6550000	CAS No			111-87-5							
1-Octanol	1075	3	NI	3	R	2	0	1	0	(2)	2	2			Fp	2
Octanol (all isomers)	540	RTECS No			RH6550000	CAS No			111-87-5							
Octene (all isomers)	1079	4	NI	4	NR	3	NI	0	0	0	2	1	A		FE	2
Octene (all isomers)	541	RTECS No				CAS No										
Octyl acetate	1080	3	NI	3	R	2	NI	0	0	(1)	1	NI			FD	1
n-Octyl acetate	483	RTECS No			AJ1400000	CAS No			112-14-1							
Octyl decyl adipate	1082	0	NI	0	(R)	(0)	(0)	(0)	(0)	(1)	(1)	(1)			Fp	2
Octyl decyl adipate	543	RTECS No				CAS No			110-29-2							
Olefin/Alkyl ester copolymer (molecular weight 2000+) (LOA)	1965	NI	NI	0	NR	0	NI	0	0	(0)	0	0			Fp	2
Olefin-Alkyl ester copolymer (molecular weight 2000+)	546	RTECS No				CAS No										
Olefin mixture (C7-C9)	2385	5	4	4	NR	4	NI	(0)	0	0	2	1	A		E	2
Olefin Mixture (C7-C9) C8 rich, stabilised	3548	RTECS No				CAS No			97593-00-5							
Olefin mixtures (C5-C7)	2243	3	NI	3	R	3	NI	(0)	(0)	(1)	(2)	(1)			E	2
Olefin mixtures (C5-C7)	545	RTECS No				CAS No										
Olefin mixtures (C5-C15)	2321	(5)	NI	(5)	NR	(4)	NI	(0)	(0)	(2)	(2)	(1)	A		FE	2
Olefin mixtures (C5-C15)	544	RTECS No				CAS No										
Olefins C13 and above, all isomers	2028	5	NI	5	NR	0	NI	0	0	(0)	0	0			Fp	2
Olefins (C13+, all isomers)	547	RTECS No				CAS No										
alpha-Olefins (C6-C18),mixture	2030	(5)	NI	(5)	NR	(4)	NI	(0)	(0)	(2)	(2)	(1)	A		FE	2
alpha-Olefins (C6-C18) mixtures	108	RTECS No				CAS No										
Oleic acid	1089	0	NI	0	R	0	NI	0	1	(2)	1	1			Fp	2
Oleic acid	548	RTECS No			RG2275000	CAS No			112-80-1							
Oleylamine	1862	0	NI	0	NR	4	NI	1	(1)	(3)	3B	3			Fp	3
Oleylamine	550	RTECS No				CAS No										
Olive oil	1090	0	NI	0	R	(2)	NI	(0)	(0)	(1)	1	1			Fp	2
Olive oil	2771	RTECS No			RK4300000	CAS No			8001-25-0							
Orange juice	2375	0	0	0	R	0	0	0	0	(0)	0	0			D	0
Orange juice	3151	RTECS No				CAS No										

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Orange juice (not concentrated)	2382	0	0	0	R	0	0	0	0	(0)	0	0			D	0	
Orange juice (not concentrated)	3425	RTECS No			CAS No												
Oxatetra-azahydroxyalkanoic acid, substituted with acetic acid / acetoxymethanolamine	2413	1	NI	1	R	1	NI	0	0	0	0	0			D	0	
Oxatetra-azahydroxyalkanoic acid, substituted with acetic acid / acetoxymethanolamine	3689	RTECS No			CAS No												
Oxygenated aliphatic hydrocarbon mixture	2266	5	2	(2)	NR	1	NI	0	0	(1)	1	1			FE	2	
Oxygenated aliphatic hydrocarbon mixture	2825	RTECS No			CAS No												
Palm acid oil	2307	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1			Fp	2	
Palm acid oil	3037	RTECS No			CAS No												
Palm fatty acid distillate	2310	NI	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1			Fp	2	
Palm fatty acid distillate	3040	RTECS No			CAS No												
Palm kernel fatty acid distillate	2335	(0)	0	0	R	(3)	NI	0	(0)	(2)	1	2			Fp	2	
Palm kernel fatty acid distillate	3111	RTECS No			CAS No												
Palm kernel olein (containing less than 5 % free fatty acids)	2308	(0)	NI	(0)	(R)	1	NI	(0)	(0)	(0)	(0)	(0)			Fp	2	
Palm kernel olein	3038	RTECS No			CAS No												
Palm kernel stearin (containing less than 5% free fatty acids)	2309	0	(0)	(0)	(R)	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2	
Palm kernel stearin	3039	RTECS No			CAS No												
Palm Mid Fraction	2363	(0)	NI	(0)	(R)	(0)	NI	0	0	(0)	(0)	(0)			Fp	2	
Palm mid-fraction	3126	RTECS No			CAS No												
Palm nut oil	1094	0	NI	0	R	1	NI	(0)	(0)	(1)	(0)	(1)			Fp	2	
Palm kernel oil	2766	RTECS No			CAS No												
Palm nut oil fatty acid	1095	0	NI	0	R	(3)	NI	0	0	(2)	1	2			Fp	2	
Palm kernel acid oil	553	RTECS No			CAS No												
Palm oil (containing less than 15% free fatty acids)	2249	0	NI	0	R	0	NI	0	(0)	(0)	0	0			Fp	2	
Palm oil	2764	RTECS No			CAS No												
Palm oil (containing more than 15% and less than 30% free fatty acids)	2364	0	NI	0	R	0	NI	0	0	(2)	(2)	(2)			Fp	2	
Non-edible industrial grade palm oil	3127	RTECS No			CAS No												
Palm oil fatty acid methyl ester	1097	0	NI	0	R	0	NI	0	0	0	0	1			Fp	2	
Palm oil fatty acid methyl ester	554	RTECS No			CAS No												
Palm olein	2250	0	NI	0	R	0	NI	0	(0)	(0)	0	0			Fp	2	
Palm olein	2765	RTECS No			CAS No												

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Palm stearin	2251	0	NI	0	R	0	NI	0	(0)	(0)	0	0			Fp	2		
Palm stearin	555	RTECS No			CAS No													
Paraffin wax	1086	0	NI	0	R	0	NI	(0)	(0)	(1)	1	1			Fp	2		
Paraffin wax	556	RTECS No			RV0350000	CAS No 8002-74-2												
Paraldehyde	1098	0	0	0	NR	0	NI	1	0	0	1	3			D	3		
Paraldehyde	557	RTECS No			YK0525000	CAS No 123-63-7												
Pentachloroethane	1099	3	2	2	NI	3	1	1	(1)	1	(1)	(1)	CT		S	3		
Pentachloroethane	558	RTECS No			KI6300000	CAS No 76-01-7												
1,3-Pentadiene	1102	2	NI	2	NR	2	NI	0	0	0	1	(2)			E	2		
1,3-Pentadiene	14	RTECS No			RZ2464000	CAS No 504-60-9												
1,3-Pentadiene (greater than 50%), cyclopentene and isomers, mixtures.	2390	NI	NI	(3)	(NR)	(3)	NI	(2)	(1)	(3)	(2)	(2)	CMR		E	3		
1,3-Pentadiene (greater than 50%), cyclopentene and isomers, mixtures	3560	RTECS No			CAS No													
Pentaethylene hexamine	1103	0	NI	0	NI	4	NI	1	(2)	(3)	3	(3)	S		D	3		
Pentaethylenehexamine	560	RTECS No			RZ2680000	CAS No 4067-16-7												
Pentane	1105	3	NI	3	R	3	NI	0	0	0	1	1			E	2		
Pentane (all isomers)	561	RTECS No			RZ9450000	CAS No 109-66-0												
1,5-Pentanedial solution, (5-50%)	1107	0	NI	0	R	3	0	1	0	4	3	3	S		D	3		
Glutaraldehyde solutions (50% or less)	362	RTECS No			MA2450000	CAS No 111-30-8												
Pentanoic acid	1109	1	NI	1	NI	2	NI	1	2	(3)	3	3			FD	3		
Pentanoic acid	562	RTECS No			YV6100000	CAS No 109-52-4												
Pentanoic acid (64%)/2-methyl butyric acid (36%) mixture	2144	(1)	NI	(1)	NI	(2)	NI	(1)	(2)	(3)	3	(3)			FD	3		
n-Pentanoic acid (64%)/2-Methyl butyric acid (36%) mixture	2211	RTECS No			CAS No													
1-Pentanol	1110	1	1	1	(R)	1	0	1	0	(3)	2	3			FED	3		
n-Amyl alcohol	473	RTECS No			SB9800000	CAS No 71-41-0												
2-Pentanol	1111	1	1	1	R	1	0	0	(0)	(2)	2	2			D	2		
sec-Amyl alcohol	637	RTECS No			SA4900000	CAS No 6032-29-7												
Pentasodium triphosphate (*)	2418	Inorg	0	0	Inorg	1	NI	NI	NI	NI	NI	NI			NI	NI		
Pentene (all isomers)	3694	RTECS No			CAS No													
Pentene (all isomers)	1992	2	NI	2	NI	(2)	NI	(0)	(0)	(0)	(0)	(1)			E	2		
Pentene (all isomers)	563	RTECS No			CAS No													

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1-Pentene	1114	2	NI	2	NI	(2)	NI	(0)	(0)	0	(0)	(1)				E	2
1-Pentene	2679	RTECS No						CAS No			109-67-1						
2-Pentene	1115	2	NI	2	NI	2	NI	(0)	(0)	(0)	(0)	(1)				E	2
2-Pentene	2678	RTECS No						CAS No			109-68-2						
Pentylol	2447	(1)	(1)	(1)	(R)	(2)	(0)	(1)	(1)	(2)	(2)	(3)				FED	3
Pentylol	3825	RTECS No						CAS No									
Petrolatum	2244	0	NI	0	NR	0	NI	0	0	2	1	1				Fp	2
Petrolatum	565	RTECS No						CAS No									
Petroleum wax	1122	0	NI	0	NR	0	NI	0	0	(0)	0	0				Fp	2
Waxes	741	RTECS No			RV0350000			CAS No			8002-74-2						
Phenol	1124	1	2	2	R	3	0	2	2	(3)	3	3		NT	S		3
Phenol	566	RTECS No			SJ3325000			CAS No			108-95-2						
Phenylxylethane	1135	5	4	4	NR	(2)	NI	1	0	(1)	(0)	0				F	1
1-Phenyl-1-xyllyl ethane	23	RTECS No			CZ7300000			CAS No			40766-31-2						
Phosphate esters, alkyl(C12-C14)amine (LOA)	1854	2	NI	2	NR	3	NI	0	(0)	(2)	1	2				FD	2
Phosphate esters, alkyl (C12-C14) amine	1345	RTECS No						CAS No									
Phosphoric acid	1138	0	NI	0	Inorg	1	NI	(3)	(3)	3	3	3				D	3
Phosphoric acid	567	RTECS No			TB6300000			CAS No			7664-38-2						
Phosphorus (elemental yellow)	1139	Inorg	(3)	(3)	Inorg	6	4	0	0	0	2	1				S	2
Phosphorus, yellow or white	568	RTECS No			TH3500000			CAS No			7732-14-0						
Phthalic anhydride (molten)	1146	1	NI	1	R	2	0	1	0	(3)	1	3	S			S	3
Phthalic anhydride (molten)	569	RTECS No			TI3150000			CAS No			85-44-9						
alpha-Pinene	40	4	NI	4	R	4	NI	0	0	0	1	(1)		T	F		3
alpha-Pinene	109	RTECS No			DT7000000			CAS No			80-56-8						
beta-Pinene	41	4	NI	4	(R)	4	NI	0	0	0	1	(1)	S	NT	F		3
beta-Pinene	141	RTECS No			DT5078500			CAS No			1330-16-1						
Pine oil	1148	4	NI	4	NR	4	NI	0	0	(1)	(1)	(1)	S	(T)	Fp		3
Pine oil	570	RTECS No			TK5100000			CAS No			8002-09-3						
Piperazine, 68% Aqueous	2433	0	NI	0	NR	2	NI	0	0	2	3A	3	SN			SD	3
Piperazine, 68% Aqueous	3748	RTECS No						CAS No			110-85-0						

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Pol (2-8) alkylene (C2-C3) glycols/ Polyalkylene (C2-C10) glycols monoalkyl ethers and their borate esters	2358	(1)	NI	(1)	(R)	(1)	(0)	0	0	0	2	2				D	2
Brake fluid base mix: Poly(2-8)alkylene (C2-C3) glycols/Polyalkylene (C2-C10) glycols monoalkyl (C1-C4) ethers and their borate esters	144	RTECS No						CAS No									
Polyacrylic acid (40% solution)	2302	(2)	NI	(2)	NR	1	NI	0	0	(1)	1	1				D	1
Polyacrylic acid solution (40% or less)	2709	RTECS No						CAS No									
Poly(C18-C22)alkyl acrylate in xylene	1151	(3)	NI	(3)	NR	2	NI	0	0	(2)	2	1				Fp	2
Polyalkyl (C18-C22) acrylate in xylene	580	RTECS No						CAS No									
Polyalkylalkenaminesuccinimide, molybdenum oxysulphide	2379	NI	0	0	NR	0	NI	0	0	(0)	0	0				Fp	2
Polyalkylalkenaminesuccinimide, molybdenum oxysulphide	3422	RTECS No						CAS No									
Poly(2-8)alkylene glycol monoalkyl(C1-C6) ether	1152	1	NI	1	R	1	0	0	0	0	2	2				D	2
Poly(2-8)alkylene glycol monoalkyl(C1-C6) ether	576	RTECS No						CAS No									
Poly(2-8)alkylene glycol monoalkyl (C1-C6) ether acetate	2254	1	NI	1	NR	2	1	0	0	0	2	2				D	2
Poly(2-8)alkylene glycol monoalkyl (C1-C6) ether acetate	575	RTECS No						CAS No									
Poly alkyl methacrylate (C1-C20) (LOA)	1984	(5)	NI	(5)	NR	0	NI	0	0	0	0	0				Fp	2
Polyalkyl (C10-C20) methacrylate	2189	RTECS No						CAS No									
Poly alkyl(C10-C18) methacrylate/ethylene-propylene copolymer mixture	2201	0	0	0	NR	0	0	0	0	(1)	1	1	A			Fp	3
Polyalkyl (C10-C18) methacrylate/ethylene-propylene copolymer mixture	2188	RTECS No						CAS No									
Polyaluminium chloride (sol.)	1136	Inorg	0	0	Inorg	0	NI	(0)	(0)	(1)	(0)	(1)				D	1
Polyaluminium chloride solution	584	RTECS No			BD0549500			CAS No			1327-41-9						
Polybutene	1154	0	NI	0	(NR)	(0)	(0)	(0)	(0)	(0)	(0)	(0)				Fp	2
Polybutene	585	RTECS No			EM9032000			CAS No			9003-29-6						
Polybutenylsuccinimide in oil	2055	5	NI	5	NR	0	NI	(0)	(0)	(0)	0	(0)				Fp	2
Polybutenyl succinimide	586	RTECS No						CAS No									
Poly(2+)cyclic aromatics	2246	4	4	4	NR	(4)	NI	(1)	(1)	(2)	(1)	(1)	CM			S	3
Poly(2+)cyclic aromatics	574	RTECS No						CAS No									
Polyether, borated	1863	0	NI	0	NR	3	1	0	(0)	(1)	1	0				D	1
Polyether, borated	572	RTECS No						CAS No									
Polyether (molecular weight 2000+) (LOA)	1975	0	NI	0	NR	1	NI	0	(0)	(0)	0	0				Fp	2
Polyether (molecular weight 1350+)	587	RTECS No						CAS No									
Polyethylene amines / paraffin mixtures	1991	(5)	NI	(5)	NR	3	0	0	(1)	(3)	(2)	(3)	S			Fp	0

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Polyethylene polyamines (more than 50% C5 -C20 paraffin oil)	591	RTECS No			CAS No												
Polyethylene glycol	1157	0	NI	0	NR	0	NI	0	0	0	1	1			D	1	
Polyethylene glycol	589	RTECS No			TQ3500000	CAS No			25322-68-3								
Polyethylene glycol dimethyl ether	1158	0	NI	0	NR	0	NI	0	0	(1)	1	(1)			D	1	
Polyethylene glycol dimethyl ether	590	RTECS No			MC9630000	CAS No			24991-55-7								
Poly(ethylene glycol) methylbutenyl ether (MW >1000)	2395	NI	0	0	R	1	NI	0	0	(0)	0	0			D	0	
Poly(ethylene glycol) methylbutenyl ether (MW >1000)	3501	RTECS No			CAS No												
Polyethylene polyamines	2367	0	NI	0	NR	3	0	1	0	(3)	2	(3)	S		D	0	
Polyethylene polyamines	3131	RTECS No			CAS No												
Polyferric sulphate solution	338	Inorg	0	0	Inorg	(2)	NI	1	(1)	(3)	3	(3)			D	3	
Polyferric sulphate solution	592	RTECS No			CAS No												
Polyglycerine, sodium salt, solution	1874	0	NI	0	R	0	NI	0	0	(3)	(2)	3			D	3	
Polyglycerin, sodium salt solution (containing less than 3% sodium hydroxide)	593	RTECS No			CAS No												
Polyglycerol	1511	NI	NI	NI	NI	NI	NI	0	(0)	(0)	(0)	(0)			D	0	
Polyglycerol	594	RTECS No			CAS No												
Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less)	2287	0	0	0	NR	0	NI	0	0	(1)	0	1			D	1	
Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less)	2537	RTECS No			CAS No												
Polyisobutenamine in aliphatic (C10-C14) solvent	2192	0	0	0	NR	2	NI	0	(0)	(2)	2	1			FED	2	
Polyisobutenamine in aliphatic (C10-C14) solvent	2374	RTECS No			CAS No												
(Polyisobutene)amino products in aliphatic hydrocarbons	2455	0	NI	(5)	NR	2	NI	0	0	(1)	1	0	A		Fp	3	
Polymeric amine in aliphatic hydrocarbons	3811	RTECS No			CAS No												
Polyisobutenyl anhydride adduct	2127	0	NI	0	NR	0	NI	0	0	(1)	0	1			FD	1	
Polyisobutenyl anhydride adduct	2256	RTECS No			CAS No												
Poly(4+)isobutylene	2264	0	NI	0	NR	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2	
Poly(4+)isobutylene	578	RTECS No			CAS No												
Polymethylene polyphenyl isocyanate	1153	NI	(2)	(2)	NR	0	0	0	0	(2)	2	2	S		S	2	
Polymethylene polyphenyl isocyanate	595	RTECS No			TR0350000	CAS No			9016-87-9								
Polyolefin acid, potassium salt	1895	NI	NI	NI	NR	0	NI	0	0	(0)	0	0			NI	0	
Potassium salt of polyolefin acid	2199	RTECS No			CAS No												
Polyolefinamide alkene(C16+)amine (LOA)	2104	5	NI	5	NR	0	NI	0	0	(1)	1	(1)			Fp	2	

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Polyolefin amide alkeneamine (C17+)	597	RTECS No			CAS No												
Polyolefin amide alkeneamine (C28+) (LOA)	1971	0	NI	0	NR	0	NI	0	0	(0)	1	(1)			NI	1	
Polyolefin amide alkeneamine (C28+)	598	RTECS No			CAS No												
Polyolefin amide alkeneamine borate (C28-C250) (LOA)	1970	0	NI	0	NR	0	NI	0	0	(0)	0	(0)			Fp	2	
Polyolefin amide alkeneamine borate (C28-C250)	600	RTECS No			CAS No												
Polyolefin amide alkeneamine/molybdenum oxysulphide mi	2256	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI			NI	NI	
Polyolefin amide alkeneamine/molybdenum oxysulphide mixture	603	RTECS No			CAS No												
Polyolefin amide alkylene amine polyol	1989	0	2	2	NR	0	NI	0	0	(0)	0	0			Fp	3	
Polyolefin amide alkeneamine polyol	602	RTECS No			CAS No												
Poly (17+) olefin amine	2049	0	NI	0	NR	2	NI	0	(0)	(1)	(1)	(1)			Fp	2	
Poly (17+) olefin amine	571	RTECS No			CAS No			98761-78-5									
Polyolefinamine (C28-C250) (LOA)	2107	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)			Fp	2	
Polyolefinamine (C28-C250)	609	RTECS No			CAS No												
Polyolefinamine (C28-C250) (LOA)	2107	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)			Fp	2	
Polyolefinamine in aromatic solvent	611	RTECS No			CAS No												
Polyolefinamine (C28-C250) (LOA)	2107	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)			Fp	2	
Polyolefinamine in alkyl (C2-C4) benzenes	610	RTECS No			CAS No												
Polyolefin aminoester salt	2095	0	NI	0	NR	1	NI	0	0	(1)	1	(1)			Fp	2	
Polyolefin aminoester salts (molecular weight 2000+)	604	RTECS No			CAS No												
Polyolefin ester (C28-C250) (LOA)	1969	0	NI	0	NR	0	NI	0	0	(0)	0	0			Fp	2	
Polyolefin ester (C28-C250)	606	RTECS No			CAS No												
Polyolefin (molecular weight 300+) (LOA)	1968	0	NI	0	NR	0	NI	0	0	0	0	0			Fp	2	
Polyolefin (molecular weight 300+)	596	RTECS No			CAS No												
Polyolefin phenolic amine (C28-C250) (LOA)	1980	0	NI	0	NI	0	NI	0	0	(1)	(1)	(1)			Fp	2	
Polyolefin phenolic amine (C28-C250)	607	RTECS No			CAS No												
Polyolefin phosphoro sulphide - barium derivative (C28-C250) (LOA)	1976	0	NI	0	NI	2	NI	0	(0)	(0)	(0)	(0)			S	0	
Polyolefin phosphorosulphide, barium derivative (C28-C250)	608	RTECS No			CAS No												
Polyoxyethylene sorbitan monooleate	1442	3	NI	3	NI	(3)	NI	0	(0)	(1)	0	1			D	1	
Poly(20)oxyethylene sorbitan monooleate	577	RTECS No			WG2932500	CAS No			9005-65-6								
Polyoxypropylene diamine	2352	1	NI	1	NR	1	NI	0	0	(3)	3	3			D	3	

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	3112	RTECS No			CAS No													
Polypropylene	1512	0	NI	0	NR	(0)	NI	(0)	(0)	(0)	(0)	(0)			F	1		
Poly(5+)propylene	579	RTECS No			UD1842000	CAS No 9003-07-0												
Polypropylene glycol	1159	0	NI	0	(NR)	1	NI	1	0	(1)	1	1			D	1		
Polypropylene glycol	612	RTECS No			TR6125000	CAS No 25322-69-4												
Polysiloxane	1161	NI	4	4	NI	2	NI	0	(0)	(0)	0	0			F	1		
Polysiloxane	613	RTECS No			CAS No													
Polysiloxane	1161	NI	4	4	NI	2	NI	0	(0)	(0)	0	0			F	1		
Dimethylpolysiloxane	275	RTECS No			CAS No													
Poly (tetramethylene) ether glycol (mw 600-3000)	2147	2	NI	2	NR	3	NI	0	0	(0)	0	(0)			FD	0		
Poly(tetramethylene ether) glycol (mw 600-3000)	2540	RTECS No			CAS No													
Potassium chloride brine (less than 26%)	2345	0	0	0	Inorg	0	0	0	(0)	(0)	0	0			D	0		
Potassium chloride solution (less than 26%)	3109	RTECS No			CAS No													
Potassium chloride solution	1513	0	0	0	Inorg	1	0	0	(0)	(0)	0	0			D	0		
Potassium chloride solution	614	RTECS No			TS8050000	CAS No 7447-40-7												
Potassium formate solution (75% or more)	2121	0	NI	0	R	0	NI	(0)	(0)	(2)	2	2			D	2		
Potassium formate solutions	615	RTECS No			LQ9625000	CAS No 590-29-4												
Potassium hydroxide (sol.)	1171	Inorg	0	0	Inorg	2	NI	2	(2)	(3)	3C	3			D	3		
Potassium hydroxide solution	616	RTECS No			TT2100000	CAS No 1310-58-3												
Potassium oleate	1497	3	NI	3	R	4	NI	(0)	(0)	(1)	1	1			FD	1		
Potassium oleate	617	RTECS No			RK1150000	CAS No 143-18-0												
Potassium thiosulphate solution (50% or less)	2152	Inorg	0	0	Inorg	2	NI	0	0	(2)	2	(2)			D	2		
Potassium thiosulphate (50% or less)	2335	RTECS No			CAS No													
Propanol	1180	0	NI	0	R	0	NI	1	0	0	1	2	R		D	3		
n-Propyl alcohol	488	RTECS No			UH8225000	CAS No 71-23-8												
Propanolamine	1183	0	NI	0	R	2	NI	0	1	(3)	3	3			D	3		
n-Propanolamine	485	RTECS No			UA5600000	CAS No 156-87-6												
2-Propene-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer (aqueous solution)	2420	0	NI	0	R	2	0	0	(0)	(0)	0	(0)			D	0		
2-Propene-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer	3696	RTECS No			CAS No													
2-Propenoic acid polymer with furandione (65% in 2-butoxyethanol)	2435	0	NI	0	NR	2	0	1	0	0	2	2			Fp	2		

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	3750	RTECS No			CAS No													
2-Propenoic acid polymer with furandione (65% in 2-butoxyethanol)	3750	RTECS No			CAS No													
beta-Propiolactone	1184	0	NI	0	R	(2)	NI	2	(2)	4	3B	3	CM		D	3		
beta-Propiolactone	142	RTECS No			RQ7350000	CAS No 57-57-8												
Propionaldehyde	1185	0	NI	0	R	2	NI	1	0	1	2	2			DE	2		
Propionaldehyde	619	RTECS No			UE0350000	CAS No 123-38-6												
Propionic acid	1186	0	NI	0	R	2	NI	0	0	(3)	3B	3			D	3		
Propionic acid	620	RTECS No			UE5950000	CAS No 79-09-4												
Propionic anhydride	1187	0	NI	0	R	2	NI	0	0	(3)	2	3			FD	3		
Propionic anhydride	621	RTECS No			UF9100000	CAS No 123-62-6												
Propionitrile	1188	0	NI	0	NI	0	NI	3	3	4	1	2	R		D	3		
Propionitrile	622	RTECS No			UF9625000	CAS No 107-12-0												
Propyl acetate	1191	1	NI	1	R	2	NI	0	0	0	1	1			ED	1		
n-Propyl acetate	487	RTECS No			AJ3675000	CAS No 109-60-4												
Propylamine	1194	0	NI	0	NI	1	NI	2	2	3	3	3			DE	3		
n-Propylamine	490	RTECS No			UH9100000	CAS No 107-10-8												
Propyl benzene	1196	NI	NI	NI	NI	3	NI	NI	NI	NI	NI	NI		(T)	FE	NI		
Propylbenzene	2686	RTECS No			DA8750000	CAS No 103-65-1												
Propyl chloride	1198	2	NI	2	NI	1	NI	0	NI	NI	NI	NI			FED	2		
n-Propyl chloride	489	RTECS No			TX4400000	CAS No 540-54-5												
Propylene carbonate	2056	0	NI	0	R	0	NI	0	0	(3)	2	3			D	3		
Propylene carbonate	624	RTECS No			FF9650000	CAS No 108-32-7												
Propylene dimer	1201	3	NI	3	R	3	NI	NI	NI	NI	NI	NI			E	2		
Propylene dimer	625	RTECS No			CAS No													
1,2-Propylene glycol	1202	0	NI	0	R	0	0	0	0	(1)	0	1			D	1		
Propylene glycol	626	RTECS No			TY2000000	CAS No 57-55-6												
Propylene glycol methyl ether acetate	1759	0	NI	0	NR	1	NI	0	0	0	0	1			D	1		
Propylene glycol methyl ether acetate	627	RTECS No			AI8925000	CAS No 108-65-6												
Propylene glycol monoalkyl ether	1958	0	NI	0	NR	0	NI	0	1	0	2	3			D	3		
Propylene glycol monoalkyl ether	628	RTECS No			CAS No													
Propylene glycol phenyl ether	2057	1	NI	1	NI	1	NI	0	0	(1)	(1)	(1)			SD	1		

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Propylene glycol phenyl ether	629		RTECS No		UB8886000				CAS No		4169-04-4					
Propylene oxide	76	0	NI	0	R	2	NI	1	1	2	2	3	CMR		DE	3
Propylene oxide	630		RTECS No		TZ2975000				CAS No		75-56-9					
Propylene oxide/Ethylene oxide mixture	78	0	NI	0	R	1	NI	1	1	3	3	3	CMR		DE	3
Ethylene oxide/Propylene oxide mixture with an ethylene oxide content of not more than 30% by mass	341		RTECS No						CAS No							
Propylene tetramer	2255	NI	4	4	NR	(4)	NI	(0)	(0)	(1)	(1)	(1)			F	1
Propylene tetramer	631		RTECS No						CAS No							
Propylene trimer	1207	5	4	4	NR	3	2	(0)	(0)	(1)	(1)	(1)			FE	2
Propylene trimer	632		RTECS No		UD2794000				CAS No		13987-01-4					
Pyridine	1213	0	NI	0	R	3	0	1	1	2	1	3		NT	D	3
Pyridine	634		RTECS No		UR8400000				CAS No		110-86-1					
Pyridine bases	2131	1	NI	1	R	2	NI	2	1	(3)	3B	3			FED	3
Paraldehyde-ammonia reaction product	1989		RTECS No						CAS No							
Pyrolysis gasoline	2271	(4)	(3)	(3)	(R)	(3)	(1)	1	0	(2)	2	2	TCM		FE	3
Pyrolysis gasoline (containing benzene)	1990		RTECS No						CAS No							
Rapeseed oil (high erucic acid; containing less than 4% free fatty acids)	2315	0	NI	0	R	(2)	NI	(0)	(0)	(0)	(1)	(1)			Fp	2
Rapeseed oil	3045		RTECS No						CAS No							
Rapeseed oil (Low erucic acid containing less than 4% free fatty acids)	2296	0	NI	0	R	(2)	NI	0	0	0	(1)	(1)			Fp	2
Rapeseed oil (low erucic acid containing less than 4% free fatty acids)	2956		RTECS No						CAS No							
Rape seed oil fatty acid, methyl ester	2209	0	0	0	R	0	NI	0	(0)	(1)	1	1			Fp	2
Rape seed oil fatty acid methyl esters	2576		RTECS No						CAS No							
Rice bran oil (containing less than 15% of free fatty acids)	2312	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1			Fp	2
Rice bran oil	3043		RTECS No						CAS No							
Rosin	1219	3	NI	3	NR	3	NI	0	0	2	(1)	1	S		S	2
Rosin	635		RTECS No						CAS No		8050-09-7					
Rosin soap (disproportionated solution)	1220	3	NI	3	NR	3	NI	0	NI	NI	NI	NI			S	NI
Rosin soap (disproportionated) solution	636		RTECS No						CAS No							
Safflower oil (containing less than 5% free fatty acids)	1222	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(1)	1	1			Fp	2
Safflower oil	3041		RTECS No		VN2230000				CAS No		8001-23-8					
Saturated and unsaturated alkyl (C10-C20) phosphite (LOA)	2108	0	NI	0	R	1	NI	0	0	(0)	0	0			Fp	2

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Alkyl(C10-C20, saturated and unsaturated) phosphite	96		RTECS No						CAS No							
Shea butter (containing less than 15% free fatty acids)	2311	(0)	NI	(0)	NR	(0)	NI	(0)	(0)	(1)	(0)	(1)			Fp	2
Shea butter	3042		RTECS No						CAS No							
Silica slurry	1514	Inorg	0	0	Inorg	0	0	(0)	(0)	0	(0)	(0)			S	0
Microsilica slurry	2507		RTECS No						CAS No		7631-86-9					
Sodium acetate	1498	0	NI	0	R	0	NI	0	0	0	1	1			D	1
Sodium acetate solutions	639		RTECS No		AJ4375000				CAS No		127-09-3					
Sodium aluminate (solution)	1234	Inorg	0	0	Inorg	NI	NI	(0)	(0)	(3)	(3)	(3)			D	3
Sodium aluminate solution	641		RTECS No		BD1600000				CAS No		11138-49-1					
Sodium aluminosilicate slurry	1235	Inorg	0	0	Inorg	1	0	0	0	0	1	1			S	1
Sodium aluminosilicate slurry	643		RTECS No						CAS No		1344-00-9					
Sodium benzoate	1475	0	NI	0	R	1	NI	0	(0)	(1)	0	1			D	1
Sodium benzoate	644		RTECS No		DH6650000				CAS No		532-32-1					
Sodium bicarbonate solution (less than 10%)	2386	0	NI	0	Inorg	0	0	0	0	(0)	0	0			D	0
Sodium bicarbonate solution (less than 10%)	3558		RTECS No						CAS No		144-55-8					
Sodium borohydride/sodium hydroxide mixture (soln.)	1239	Inorg	0	0	Inorg	2	NI	(2)	(1)	(3)	(3)	(3)			D	3
Sodium borohydride (15% or less)/Sodium hydroxide solution	645		RTECS No						CAS No							
Sodium bromide solution (less than 50%)	2387	0	NI	0	Inorg	0	0	0	0	(1)	0	1	R		D	3
Sodium bromide solution (less than 50%) (*)	3410		RTECS No		VZ 315000				CAS No		7647-15-6					
Sodium carbonate	1243	Inorg	0	0	Inorg	1	NI	0	0	2	1	2			SD	2
Sodium carbonate solution	646		RTECS No		VZ4050000				CAS No		497-19-8					
Sodium chlorate solid and solutions (50% or less)	1244	Inorg	0	0	Inorg	1	NI	1	0	(2)	1	1	S		D	2
Sodium chlorate solution (50% or less)	647		RTECS No		FO0525000				CAS No		7775-09-9					
Sodium dichromate solution	487	Inorg	0	0	Inorg	4	1	2	2	4	2	3	CMS		D	3
Sodium dichromate solution (70% or less)	649		RTECS No		HX7700000				CAS No		10588-01-9					
Sodium dodecyl sulphate (*)	2451	0	NI	0	R	3	1	NI	NI	NI	NI	NI			NI	NI
	3869		RTECS No						CAS No							
Sodium hydrogen sulphide/Ammonium sulphide(mixture)	1253	Inorg	0	0	Inorg	3	NI	1	1	0	2	2			D	2
Sodium hydrosulphide/Ammonium sulphide solution	653		RTECS No						CAS No							
Sodium hydrogen sulphide (6% or less)/sodium carbonate (3% or less)	2262	0	NI	0	Inorg	1	NI	(0)	(0)	(1)	(1)	(1)			D	1

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Sodium hydrogen sulphide (6% or less)/Sodium carbonate (3% or less) solution	650	RTECS No			CAS No												
Sodium hydrogen sulphide, solutions	1252	Inorg	0	0	Inorg	1	NI	1	1	1	2	2				D 2	
Sodium hydrosulphide solution (45% or less)	652	RTECS No			WE1900000			CAS No			16721-80-5						
Sodium hydrogen sulphite, solutions	1251	Inorg	0	0	Inorg	1	NI	0	(0)	(0)	0	0				D 0	
Sodium hydrogen sulphite solution (45% or less)	651	RTECS No			VZ2000000			CAS No			7631-90-5						
Sodium hydroxide	1254	Inorg	0	0	Inorg	2	NI	1	1	(3)	3C	3				D 3	
Sodium hydroxide solution	654	RTECS No			WB4900000			CAS No			1310-73-2						
Sodium hypochlorite solutions containing 20% and less but more than 2% NaOCl	1256	Inorg	0	0	Inorg	(4)	(1)	0	0	1	3	3	S			D 3	
Sodium hypochlorite solution (15% or less)	2785	RTECS No			NH3486300			CAS No			7681-52-9						
Sodium hypochlorite solutions containing more than 20% NaOCl	1255	Inorg	0	0	Inorg	5	2	0	0	1	3	3	S			D 3	
Sodium hypochlorite solution (Full strength solution)	655	RTECS No			NH3486300			CAS No			7681-52-9						
Sodium methylate (**)	2443	NI	NI	(0)	(R)	(2)	NI	NI	NI	NI	NI	NI	T			DE NI	
Sodium methylate	3822	RTECS No			CAS No												
Sodium Methylate (21-30% in Methanol)	2427	0	NI	0	R	1	NI	2	(2)	(3)	3	3	T			D 3	
Sodium methylate 21-30% in methanol	3608	RTECS No			CAS No												
Sodium nitrate	1259	Inorg	0	0	Inorg	0	NI	(0)	(0)	(0)	(1)	(1)				SD 1	
Sodium nitrate	656	RTECS No			WC5600000			CAS No			7631-99-4						
Sodium nitrite	340	Inorg	0	0	Inorg	3	0	2	(2)	2	0	1				SD 2	
Sodium nitrite solution	658	RTECS No			RA1225000			CAS No			7632-00-0						
Sodium perborate monohydrate	2284	Inorg	NI	NI	Inorg	3	NI	1	0	(3)	2	3				NI 3	
Sodium perborate monohydrate	2948	RTECS No			CAS No												
Sodium petroleum sulphonate	1860	0	NI	0	(NR)	2	NI	0	(0)	(2)	1	2	S			S 2	
Sodium petroleum sulphonate	660	RTECS No			CAS No												
Sodium polyacrylate solution	1487	0	NI	0	NR	1	0	0	(0)	(1)	1	1				D 1	
Sodium poly(4+)acrylate solutions	826	RTECS No			CAS No												
Sodium silicate (solution)	1262	Inorg	0	0	Inorg	2	NI	1	0	(3)	3	3				D 3	
Sodium silicate solution	661	RTECS No			CAS No			1344-09-8									
Sodium sulphate (solution)	1499	Inorg	0	0	Inorg	0	0	0	(0)	(1)	1	1				SD 1	
Sodium sulphate solutions	662	RTECS No			WE1650000			CAS No			7757-82-6						
Sodium sulphide (solution)	1263	Inorg	0	0	Inorg	3	NI	1	1	(3)	3A	3				D 3	

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Sodium sulphide solution (15% or less)	663	RTECS No			WE1905000			CAS No			1313-82-2						
Sodium sulphite (solution)	9	Inorg	0	0	Inorg	2	NI	0	(0)	(1)	0	1				D 1	
Sodium sulphite solution (25% or less)	664	RTECS No			WE2150000			CAS No			7757-83-7						
Sodium tartrate succinate/Sodium tartrate disuccinate mixtures	1771	NI	1	1	NI	1	NI	0	NI	NI	NI	NI				D NI	
Sodium tartrates/Sodium succinates solution	665	RTECS No			CAS No												
Sodium thiocyanate	1264	Inorg	0	0	Inorg	2	NI	1	(0)	(1)	0	0				D 1	
Sodium thiocyanate solution (56% or less)	667	RTECS No			XL2275000			CAS No			540-72-7						
Sorbitan monooleate	2215	(5)	NI	(5)	R	3	NI	0	NI	NI	0	0				Fp 2	
Sorbitan monooleate	2408	RTECS No			CAS No												
Sorbitol	1265	0	NI	0	R	0	NI	0	(0)	(0)	(0)	(0)				D 0	
Sorbitol solution	668	RTECS No			LZ4290000			CAS No			50-70-4						
Soyabean oil (containing less than 4% free fatty acids)	2320	0	NI	0	R	0	NI	0	(0)	(1)	(0)	1				Fp 2	
Soyabean oil	3050	RTECS No			CAS No												
Soybean oil fatty acids, methyl esters	2431	0	NI	0	R	2	NI	0	0	0	0	0				Fp 2	
Soybean oil fatty acids, methyl esters	3737	RTECS No			CAS No												
Styrene (monomer)	1273	3	(2)	3	R	3	NI	1	0	2	2	2	CM			FE 3	
Styrene monomer	669	RTECS No			WL3675000			CAS No			100-42-5						
Styrene butadiene rubber latex	1274	0	NI	0	NR	0	NI	0	0	(1)	0	1				D 1	
Latex: Carboxylated styrene-Butadiene copolymer; Styrene-Butadiene rubber	414	RTECS No			CAS No												
Sulfurized fat(C14-C20) (LOA)	1853	0	NI	0	NR	1	NI	0	(0)	(1)	0	(1)				FD 1	
Sulphurized fat (C14-C20)	2257	RTECS No			CAS No												
Sulfurized polyolefinamide alkene(C28-C250)amine (LOA)	1855	0	NI	0	NR	0	NI	0	0	(0)	0	0				FD 0	
Sulphurized polyolefinamide alkene (C28-C250) amine	2258	RTECS No			CAS No												
Sulpho hydrocarbon (C3-C88) (LOA)	1972	4	NI	4	NR	2	NI	0	0	0	0	0				Fp 2	
Sulphohydrocarbon (C3-C88)	672	RTECS No			CAS No												
Sulpholane	1277	0	1	1	NR	2	0	1	0	0	1	2				SD 2	
Sulpholane	673	RTECS No			XN0700000			CAS No			126-33-0						
Sulphonated polyacrylate solution	1760	NI	0	0	NI	0	NI	(0)	(0)	(0)	(0)	(0)				D 0	
Sulphonated polyacrylate solution	674	RTECS No			CAS No												
Sulphur	906	Inorg	0	0	Inorg	0	NI	0	0	(1)	1	1				S 1	

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Sulphur (molten)	675	RTECS No		WS4250000				CAS No		7704-34-9						
Sulphuric acid	1280	0	NI	0	Inorg	2	NI	0	(0)	3	3C	3	C		D	3
Sulphuric acid, spent	677	RTECS No		WS5600000				CAS No		7664-93-9						
Sulphuric acid	1280	0	NI	0	Inorg	2	NI	0	(0)	3	3C	3	C		D	3
Sulphuric acid	676	RTECS No		WS5600000				CAS No		7664-93-9						
Sulphuric acid	1280	0	NI	0	Inorg	2	NI	0	(0)	3	3C	3	C		D	3
Oleum	549	RTECS No		WS5600000				CAS No		7664-93-9						
Sunflower oil	1283	0	NI	0	R	0	NI	(0)	(0)	(1)	(0)	(1)			Fp	2
Sunflower seed oil	2782	RTECS No						CAS No		8001-21-6						
sym-Dichlorodiethyl ether	588	1	1	1	NR	1	0	2	3	4	1	3		T	SD	3
Dichloroethyl ether	233	RTECS No		KN0875000				CAS No		111-44-4						
Tall oil acids/linoleic acid dimer/polyalkylenepolyamines/dodecylbenzenesulphonic acid complexes in naphtha/isopropanol	2448	0	NI	0	NR	1	NI	0	0	(0)	0	0	CM		Fp	3
	3866	RTECS No						CAS No								
Tall oil, crude and distilled	1285	(4)	NI	(4)	(R)	(2)	NI	0	0	(0)	0	0	S		Fp	2
Tall oil (crude and distilled)	678	RTECS No						CAS No		68187-71-3						
Tall oil, distilled	2283	0	NI	0	R	0	NI	0	(0)	(0)	0	(0)			Fp	2
Tall oil, distilled	2890	RTECS No						CAS No								
Tall oil fatty acid (resin acids less than 2%)	1287	0	0	0	R	0	0	0	0	(1)	1	0			Fp	2
Tall oil fatty acid (resin acids less than 20%)	679	RTECS No						CAS No		61790-12-3						
Tall oil fatty acid, barium salt	1864	NI	NI	NI	NI	NI	NI	(1)	(0)	(2)	1	2			S	2
Tall oil fatty acid, barium salt	680	RTECS No						CAS No								
Tall oil pitch	2323	3	NI	3	NR	0	0	0	0	(0)	0	(0)			Fp	2
Tall oil pitch	3051	RTECS No						CAS No								
Tall oil soap (disproportionated solution)	1286	NI	NI	NI	NI	NI	NI	(1)	(0)	(2)	1	2			D	2
Tall oil soap (disproportionated) solution	681	RTECS No						CAS No								
Tall oil soap, crude	2432	0	NI	0	R	2	0	(0)	(0)	(3)	(3)	(3)	S		Fp	3
Tall oil soap, crude	3735	RTECS No						CAS No								
Tallow	1288	0	NI	0	R	0	NI	0	0	(0)	(0)	(0)			Fp	2
Tallow	682	RTECS No						CAS No		61789-21-6						
Tallow fatty acid	1289	0	NI	0	R	0	NI	0	(0)	(0)	(0)	(0)			Fp	2

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Tallow fatty acid	684	RTECS No						CAS No								
1,1,2,2-Tetrachloroethane	53	2	2	2	NR	3	0	2	0	2	2	2			SD	2
Tetrachloroethane	687	RTECS No		KI8575000				CAS No		79-34-5						
1,1,2,2-Tetrachloroethylene	1295	3	2	2	NR	(3)	2	0	0	0	2	1	C		S	3
Perchloroethylene	564	RTECS No		KX3850000				CAS No		127-18-4						
Tetrachloromethane	1296	2	2	2	NR	3	0	0	0	0	1	1	CT		S	3
Carbon tetrachloride	178	RTECS No		FG4900000				CAS No		56-23-5						
Tetradecanoic acid (Myristic acid)	1298	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)			Fp	2
n-Tetradecanoic acid	491	RTECS No		QH4375000				CAS No		544-63-8						
Tetradecanoic acid (Myristic acid)	1298	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)			Fp	2
Fatty acid (saturated C13+)	347	RTECS No		QH4375000				CAS No		544-63-8						
Tetraethylene glycol	1301	0	NI	0	NR	0	NI	0	0	0	1	1			D	1
Tetraethylene glycol	688	RTECS No		XC2100000				CAS No		112-60-7						
Tetraethylene pentamine	1302	0	NI	0	NR	3	NI	0	2	(3)	3	3	S		D	3
Tetraethylene lead	689	RTECS No		KH8585000				CAS No		112-57-2						
Tetraethyl lead	1303	4	5	5	NR	5	NI	3	2	4	2	2	NR		S	3
Motor fuel anti-knock compound (containing lead alkyls)	464	RTECS No		TP4550000				CAS No		78-00-2						
Tetrahydrofuran	1304	0	NI	0	R	0	NI	0	(0)	0	1	2			DE	2
Tetrahydrofuran	690	RTECS No		LU5950000				CAS No		109-99-9						
Tetrahydronaphthalene	1305	3	3	3	NR	3	NI	0	0	(2)	2	0			F	2
Tetrahydronaphthalene	691	RTECS No		QK3850000				CAS No		119-64-2						
1,2,3,4-Tetramethylbenzene	1307	4	NI	4	NI	4	NI	0	(0)	(1)	1	(1)			F	1
Tetramethylbenzene (all isomers)	692	RTECS No		DC0465000				CAS No		488-23-3						
Tetrapotassium pyrophosphate	2400	Inorg	0	0	Inorg	1	NI	0	NI	NI	NI	NI			D	NI
Tetrapotassium pyrophosphate	3635	RTECS No						CAS No		7320-34-5						
Thixatrol plus	2210	5	NI	5	R	3	NI	0	0	0	1	1			S	1
Thixatrol Plus	2699	RTECS No						CAS No								
Titanium dioxide (64 - 77% solution in water)	2080	Inorg	1	1	Inorg	1	NI	0	0	0	1	1			NI	1
Titanium dioxide slurry	2259	RTECS No						CAS No		13463-67-7						
Toluene	330	2	2	2	R	3	0	0	0	0	2	2	ANR	NT	E	3

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Toluene	693		RTECS No		XS5250000				CAS No		108-88-3					
Toluene diisocyanate	1315	(3)	1	1	NR	2	NI	0	(0)	4	3	3	SCL		S	3
Toluene diisocyanate	694		RTECS No		CZ6300000				CAS No		584-84-9					
Toluidines	1316	1	1	1	R	4	2	1	0	(2)	2	2	CM		FD	3
o-Toluidine	537		RTECS No						CAS No							
2,4-Tolylenediamine	1317	0	2	2	NR	3	0	2	2	4	2	3	CMS		Fp	3
Toluenediamine	695		RTECS No		XS9625000				CAS No		95-80-7					
Tolyl triazole	2292	1	NI	1	NR	2	0	1	0	(2)	(1)	2			S	2
Tolyl triazole	696		RTECS No						CAS No							
Tributyl phosphate	1319	4	2	2	R	3	0	1	0	2	2	2	S		F	3
Tributyl phosphate	697		RTECS No		TC7700000				CAS No		126-73-8					
1,2,3-Trichlorobenzene	2191	4	4	4	NR	4	2	1	0	(2)	2	2			S	2
1,2,3-Trichlorobenzene (molten)	2288		RTECS No						CAS No							
1,2,4-Trichlorobenzene	1323	4	5	5	NR	4	1	1	0	(2)	2	2	M		S	3
1,2,4-Trichlorobenzene	7		RTECS No		DC2100000				CAS No		120-82-1					
1,1,1-Trichloroethane	1326	2	NI	2	NR	2	NI	0	0	0	2	2			SD	2
1,1,1-Trichloroethane	1		RTECS No		KJ2975000				CAS No		71-55-6					
1,1,2-Trichloroethane	1327	2	1	1	NR	2	0	1	0	1	2	1			SD	2
1,1,2-Trichloroethane	3		RTECS No		KJ3150000				CAS No		79-00-5					
1,1,2-Trichloro-ethylene	329	2	2	2	NR	3	NI	0	0	0	2	2	MC		SD	3
Trichloroethylene	698		RTECS No		KX4550000				CAS No		79-01-6					
Trichloromethane	1328	1	1	1	NR	2	0	2	0	2	1	1	CT		SD	3
Chloroform	186		RTECS No		FS9100000				CAS No		67-66-3					
1,2,3-Trichloropropane	1329	2	2	2	NR	2	0	2	2	2	2	2	C		SD	3
1,2,3-Trichloropropane	6		RTECS No		TZ9275000				CAS No		96-18-4					
1,1,2-Trichloro-1,2,2-trifluoroethane	1330	3	2	2	NR	3	0	0	0	0	1	1			S	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	2		RTECS No		KJ4000000				CAS No		76-13-1					
Tricresyl phosphate (less than 1% ortho-isomers)	1331	5	(3)	(3)	(R)	(4)	(4)	0	1	0	1	1	N		S	2
Tricresyl phosphate (containing less than 1% ortho-isomer)	700		RTECS No		TD0175000				CAS No		1330-78-5					
Tricresyl phosphate (more than 1% ortho-isomers)	1332	5	3	3	R	4	4	0	1	0	1	1	N		S	2

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Tricresyl phosphate (containing 1% or more ortho-isomer)	699		RTECS No		TD0175000				CAS No		1330-78-5					
Tridecane	1333	0	NI	0	NI	0	NI	0	0	(1)	1	0			Fp	2
Tridecane	701		RTECS No		YD3025000				CAS No		629-50-5					
Tridecanoic acid	1334	5	NI	5	(R)	3	NI	(0)	(0)	(1)	(1)	(1)			Fp	2
Tridecanoic acid	702		RTECS No		YD3850000				CAS No		638-53-9					
Tridecyl acetate	1768	5	NI	5	NI	0	NI	0	(0)	(2)	2	2			F	2
Tridecyl acetate	703		RTECS No						CAS No		1072-33-9					
Triethanolamine	1338	0	0	0	R	1	NI	0	0	(2)	1	2			D	2
Triethanolamine	704		RTECS No		KL9275000				CAS No		102-71-6					
3-(Triethoxysilyl)propylamine	2445	1	1	1	R	1	NI	1	0	(3)	3B	3	S		D	3
3-(Triethoxysilyl)propylamine	3824		RTECS No						CAS No		919-30-2					
Triethylamine	1339	1	0	0	R	3	0	1	2	2	2	3			D	3
Triethylamine	706		RTECS No		YE0175000				CAS No		121-44-8					
1,3,5-Triethylbenzene	1340	5	NI	5	NI	4	NI	0	(0)	(2)	(2)	(1)			F	2
Triethylbenzene	707		RTECS No		DC2490000				CAS No		25340-18-5					
Triethylene glycol	1341	0	NI	0	R	0	0	0	0	(1)	1	1			D	1
Triethylene glycol	708		RTECS No		YE4550000				CAS No		112-27-6					
Triethylenetetramine	1346	0	NI	0	NR	3	NI	0	2	(3)	3	3	S		D	3
Triethylenetetramine	709		RTECS No		YE6650000				CAS No		112-24-3					
Triethylenetetramine/2-piperazine-1-ylethylamine mixtures (#)	2456	0	NI	0	NR	2	NI	0	2	(3)	3	3	S		D	3
Triethylenetetramine/2-piperazine-1-ylethylamine mixtures (#)	3872		RTECS No						CAS No							
Triethyl phosphate	1348	0	0	0	NR	1	0	1	0	0	(2)	(2)			D	2
Triethyl phosphate	705		RTECS No		TC7900000				CAS No		78-40-0					
Triethyl phosphite	1349	0	NI	0	R	1	NI	1	0	2	1	2	S		FE	2
Triethyl phosphite	710		RTECS No		TH1130000				CAS No		122-52-1					
Triisopropanolamine	1370	0	0	0	NR	1	0	1	0	0	(2)	3			FD	3
Triisopropanolamine	711		RTECS No		UB8750000				CAS No		122-20-3					
Triisopropylated phenyl phosphates	1375	5	5	5	R	4	NI	0	0	0	0	0			S	0
Triisopropylated phenyl phosphates	712		RTECS No						CAS No		68937-41-7					
Trimethylacetic acid	1350	1	1	1	R	2	NI	1	1	(2)	2	2			Fp	2

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Trimethylacetic acid	714		RTECS No		TO7700000				CAS No		75-98-9					
Trimethylamine	1353	0	NI	0	R	1	NI	1	0	2	3	3			DE	3
Trimethylamine solution (30% or less)	715		RTECS No		PA0350000				CAS No		75-50-3					
1,2,3-Trimethyl benzene	1354	3	3	3	NR	4	0	0	0	1	2	1			FE	2
Trimethylbenzene (all isomers)	716		RTECS No		DC3300000				CAS No		526-73-8					
2,4,4-Trimethyl hexamethylene diamine	1359	1	NI	1	NI	NI	NI	1	0	(3)	2	3	S		D	3
Trimethylhexamethylenediamine (2,2,4- and 2,4,4-isomers)	718		RTECS No		MO1451000				CAS No		26520-58-0					
Trimethyl hexamethylene diisocyanate	1360	0	NI	0	NI	3	NI	0	NI	NI	NI	NI	S		NI	2
Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4-isomers)	717		RTECS No		MO1760000				CAS No		28679-16-5					
Trimethylol propane polyethoxylate	1362	NI	NI	NI	NR	1	NI	0	0	NI	NI	NI			NI	NI
Trimethylolpropane polyethoxylate	719		RTECS No						CAS No							
Trimethylol propane, propoxylated	2274	0	NI	0	(NR)	1	0	0	0	(1)	0	1			SD	1
Trimethylol propane propoxylated	2870		RTECS No						CAS No							
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	1845	4	NI	4	NR	0	NI	0	0	(1)	1	0			F	1
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	26		RTECS No						CAS No							
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate	1364	3	NI	3	NI	2	NI	0	0	(1)	1	1			Fp	2
2,2,4-Trimethyl-1,3-pentanediol-1-isobutyrate	27		RTECS No		UF6000000				CAS No		25264-77-4					
Trimethyl phosphite	1365	0	NI	0	R	NI	NI	NI	NI	NI	NI	NI			S	NI
Trimethyl phosphite	713		RTECS No		TH1400000				CAS No		121-45-9					
1,3,5-Trioxane	1844	0	NI	0	NI	0	NI	0	0	0	0	1	R		SD	3
1,3,5-Trioxane	10		RTECS No		YK0350000				CAS No		110-88-3					
Tripropylene glycol	1372	0	0	0	NR	0	NI	0	0	(0)	0	0			D	0
Tripropylene glycol	720		RTECS No		YK6825000				CAS No		24800-44-0					
Trixylyl phosphate	1377	5	4	4	NR	4	1	(0)	(1)	(0)	(1)	(1)	R		S	3
Trixylyl phosphate	721		RTECS No		ZE8320000				CAS No		25155-23-1					
Tung oil	1378	0	NI	0	R	(2)	NI	(0)	(0)	(1)	(0)	(1)			Fp	2
Tung oil	2784		RTECS No						CAS No							
Turpentine (wood)	1379	4	NI	4	NI	4	NI	0	(0)	1	(2)	2	AS	(T)	D	2
Turpentine	722		RTECS No		YO8400000				CAS No		8006-64-2					
Undecanoic acid	1381	4	NI	4	(R)	3	NI	(0)	(0)	(2)	1	(2)			Fp	2

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EHS Name TRN Name	EHS TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Undecanoic acid	723		RTECS No		YQ2275000				CAS No		112-37-8					
1-Undecanol	1382	4	NI	4	R	4	NI	0	0	(2)	2	(1)			Fp	2
Undecyl alcohol	724		RTECS No		YQ3155000				CAS No		112-42-5					
1-Undecene	1383	5	NI	5	NR	4	NI	(0)	(0)	(1)	(2)	(1)	A		F	3
1-Undecene	24		RTECS No						CAS No		821-95-4					
Urea	1384	0	0	0	R	1	NI	0	0	(1)	1	(1)			D	1
Urea solution	726		RTECS No		YR6250000				CAS No		57-13-6					
Urea	1384	0	0	0	R	1	NI	0	0	(1)	1	(1)			D	1
Urea	2627		RTECS No		YR6250000				CAS No		57-13-6					
Urea/Ammonium mono and dihydrogen phosphate/ Potassium chloride solution	1386	0	0	0	R	3	2	NI	NI	NI	NI	NI			NI	NI
Urea/Ammonium mono- and di-hydrogen phosphate/Potassium chloride solution	727		RTECS No						CAS No							
Urea/Ammonium nitrate solution (> 1% aq. ammonia)	2322	0	NI	0	R	3	NI	0	0	(2)	1	2			D	2
Urea/Ammonium nitrate solution	728		RTECS No						CAS No							
Urea/Ammonium nitrate solution (containing < 1% aq. ammonia)	1387	0	NI	0	R	1	2	0	0	(2)	1	2			D	2
Urea/Ammonium nitrate solution (containing less than 1% free ammonia)	729		RTECS No						CAS No							
Urea-ammonium phosphate solutions	2179	0	0	0	R	3	2	(0)	(0)	(2)	(2)	(2)			D	2
Urea/Ammonium phosphate solution	730		RTECS No						CAS No							
Urea-formaldehyde resin solution	1388	NI	NI	NI	NI	1	NI	1	1	NI	NI	NI	S		NI	2
Urea formaldehyde resin solution	725		RTECS No						CAS No							
Vegetable acid oils	2371	0	NI	0	R	0	NI	(0)	(0)	(1)	(1)	(1)			Fp	2
Vegetable acid oils (m)	3138		RTECS No						CAS No							
Vegetable oils fatty acid distillates	2369	0	NI	0	R	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Vegetable fatty acid distillates (m)	3137		RTECS No						CAS No							
Vegetable protein solution,hydrolyzed	1398	0	NI	0	R	0	NI	(0)	(0)	(0)	(0)	(0)			D	0
Vegetable protein solution (hydrolysed)	734		RTECS No						CAS No							
Vinyl acetate	1400	0	NI	0	R	2	NI	1	0	2	1	1	C		ED	3
Vinyl acetate	735		RTECS No		AK0875000				CAS No		108-05-4					
Vinyl ethyl ether	1405	1	NI	1	NR	1	NI	0	0	0	1	1			E	2
Vinyl ethyl ether	736		RTECS No		KO0710000				CAS No		109-92-2					
Vinylidene chloride	1406	2	1	1	NR	2	NI	2	0	(2)	2	2	M		SD	3

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EHS Name TRN Name	EHS TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Vinylidene chloride	738		RTECS No		KV9275000				CAS No		75-35-4					
Vinyl neodecanoate	1404	5	NI	5	NR	3	NI	0	0	(3)	3	3			F	3
Vinyl neodecanoate	737		RTECS No						CAS No		45115-34-2					
Vinyl toluenes	1409	3	3	3	NR	3	NI	0	0	2	2	1	NM	(T)	F	3
Vinyltoluene	739		RTECS No		WL5075000				CAS No		25013-15-4					
White spirit, low (15-20%) aromatic	1411	(4)	NI	(4)	(R)	3	NI	(0)	(0)	(2)	(1)	(2)	A		F	3
White spirit, low (15-20%) aromatic	742		RTECS No						CAS No							
Wood lignin with sodium acetate/oxalate	2403	NI	NI	(0)	NR	(0)	NI	0	(0)	(1)	(1)	(1)			D	1
Wood lignin with sodium acetate/oxalate	3638		RTECS No						CAS No							
Xylene (mixed isomers)	1408	3	NI	3	NR	3	0	0	0	0	2	2		(T)	FE	2
Xylenes	743		RTECS No		ZE2275000				CAS No		133-20-7					
Xylenes/Ethyl benzene (10% or more) mixture	2269	3	2	2	NR	3	1	(0)	(0)	(2)	(2)	(2)		(T)	FE	2
Xylenes/ethylbenzene (10% or more) mixture	2337		RTECS No						CAS No							
Xylenols (mixtures)	1422	2	NI	2	R	3	NI	1	2	(3)	3	3		(T)	Fp	3
Xylenol	744		RTECS No		ZE5425000				CAS No		1300-71-6					
Yeast Extract Solution with Propylene Glycol (25% or less)	2396	NI	0	0	R	0	NI	0	0	(1)	0	1			D	1
Stabilized Yeast Extract Solution	3631		RTECS No						CAS No		8013-01-2					
Zinc alkaryl dithiophosphate (C7-C16) (LOA)	1977	0	NI	0	NR	3	NI	0	0	(0)	(0)	(0)			Fp	2
Zinc alkaryl dithiophosphate (C7-C16)	745		RTECS No						CAS No							
Zinc alkenylcarboxamide (LOA)	2053	NI	0	0	NR	0	NI	0	0	(1)	1	(1)			Fp	2
Zinc alkenyl carboxamide	746		RTECS No						CAS No							
Zinc alkyl dithiophosphate	1428	5	NI	5	NR	3	NI	0	0	0	2	2			S	2
Zinc alkyl dithiophosphate (C3-C14)	747		RTECS No						CAS No							
Zinc bromide solutions	2227	Inorg	4	4	Inorg	3	NI	1	(2)	(3)	3B	3	S		D	3
Zinc bromide solutions	2617		RTECS No						CAS No							
Zinc chloride	1425	Inorg	4	4	Inorg	4	1	(1)	(1)	(3)	(3)	(3)			D	3
Zinc chloride	2869		RTECS No		ZH1400000				CAS No		7646-85-7					
Zinc chloride	1425	Inorg	4	4	Inorg	4	1	(1)	(1)	(3)	(3)	(3)			D	3
Drilling brines (containing zinc salts)	307		RTECS No		ZH1400000				CAS No		7646-85-7					