

Marpol Annex Vにおける貨物残渣の海洋投棄について

1. MARPOL – 規制手段

1973年の船舶による汚染の防止のための国際条約に関する1978年の議定書(Marpol 73/78)は、投棄、油濁、大気汚染を含む海洋汚染を防止することを主目的としています。

改正 Annex V は締約国を拘束します。改正 Annex V(添付 1)は以下のリンクからダウンロードできます。
[http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201\(62\).pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201(62).pdf)

改正 Annex V には以下の2つのガイドラインが含まれます。

- ・ Marpol Annex V 実施のためのガイドライン(添付 2)。当該ガイドラインは以下のリンクからダウンロードできます。

[http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219\(63\).pdf](http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219(63).pdf)

- ・ 廃棄物管理計画策定のためのガイドライン(添付 3)。当該ガイドラインは以下のリンクからダウンロードできます。

[http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/220\(63\).pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/220(63).pdf)

本紙をご一読頂くことで Marpol Annex V の概要についてご理解頂けると存じますが、詳細に関してあわせて添付物もご一読されることをお勧め致します。

2. MARPOL Annex V の概要

Marpol Annex V は原則として海洋投棄を禁止しています。特にプラスチック及び料理油は海洋投棄できません(添付 1 の Regulation 3)。

廃棄物の種類	特別エリア外船舶	特別エリア内船舶	洋上プラットフォーム及び当該プラットフォームから 500メートル以内の船舶
あらゆる廃棄物及び特にプラスチック(合繊ロープ、合繊漁網、プラスチックごみ袋、プラスチック製品の焼却灰を含む-Regulation 3.2)並びに料理油(Regulation 3.3)	海洋投棄禁止	海洋投棄禁止	海洋投棄禁止

有害性が低いと考えられる特定の廃棄物については**特別の例外**が規定されています。例外が適用されるかどうかは地理的エリアによります。あるエリアはより環境にセンシティブとみなされています。特別エリアの詳細な地理的特定(緯度/経度)については添付 1 をご参照下さい。

Annex V における特別エリア外	Annex V における特別エリア
右記以外のエリア	地中海 エリア (Regulation 1, 14.1) バルト海エリア (Regulation 1, 14.2) 黒海エリア (Regulation 1, 14.3) 紅海エリア (Regulation 1, 14.4) ガルフエリア (Regulation 1, 14.5) 北海エリア (Regulation 1, 14.6) カリブエリア (メキシコ湾及びカリブ海を含む) (Regulation 1, 14.8) 南極エリア (南緯 60°以南。Regulation 1, 14.7)については別途追加規定あり*。

※南極エリアに関する追加要求：当該エリアに寄港、通航、出航する船舶がいる港の締約国は当該船舶に対して適切な廃棄物受入れ設備を提供しなければならない。当該エリアに入域する前に船舶が全ての廃棄物を十分に保管できることを旗国は確認しなければならない。

以下の廃棄物については地理的エリアによっては海洋投棄可能な場合があります。

廃棄物の種類	Regulation 4: 特別エリア外船舶 (特別エリアの定義については上記ご参照)	Regulation 6: 廃棄物の種類による特別規則及び南極エリアに関する特別規則が適用される特別エリア内船舶 (特別エリアの定義については上記ご参照)	洋上プラットフォーム及び当該プラットフォームから 500メートル以内の全船舶 (Regulation 5)
食物廃棄物 (粉碎装置で粉碎され 25mm より小さい穴のふるいを通過できるもの)	海洋投棄可能 (航海中、領海の基線から 3 海里以遠) (Regulation 4, 1.1)	海洋投棄可能 (航海中、領海の基線から 12 海里以遠) 南極エリア (殺菌処理されていない限り、鳥製品(鶏肉を含む)の海洋投棄は禁止) (Regulation 6, 1.1)	海洋投棄可能 (プラットフォームもしくはそこから 500メートル以内にいる船舶が領海の基線から 12 海里以遠にある場合) (Regulation 5, 2)
食物廃棄物 (粉碎されていないもの)	海洋投棄可能 (航海中、領海の基線から 12 海里以遠) (Regulation 4, 1.2)	海洋投棄禁止 (Regulation 6, 1.1)	海洋投棄禁止 (Regulation 5, 1)

貨物残渣 (通常利用可能な揚荷手段を使って回収できないもので海洋環境に無害なもの) (貨物残渣の定義については下記3をご参照)	海洋投棄可能 (航海中、領海の基線から12海里以遠) (Regulation 4, 1.3) (有害貨物かどうかの分類については下記3をご参照)	特定の状況でのみ^{※※}、(貨物残渣を含む)貨物倉洗浄水だけ海洋投棄可能 (Regulation 6, 1.2) (有害貨物かどうかの分類については下記3をご参照)	海洋投棄禁止 (Regulation 5, 1)
洗剤及び添加物 (貨物倉、甲板、船体の洗浄水に含まれるもので、海洋環境に無害なもの)	海洋投棄可能 (Regulation 4, 2)	特定の状況でのみ^{※※}、貨物倉洗浄水に含まれる洗剤の海洋投棄可能 (Regulation 6, 1.2) 甲板、船体の洗浄水に含まれる洗剤の海洋投棄可能 (Regulation 6, 2)	海洋投棄禁止 (Regulation 5, 1)
動物の死体 (貨物として輸送され航海中に死亡したもの)	海洋投棄可能 (可能な限り領海の基線から離れた場所で) (Regulation 4, 1.4)	海洋投棄禁止	海洋投棄禁止 (Regulation 5, 1)
混合廃棄物 (複数廃棄物が混在、混入しているもの)	複数の混合物質のなかで、より厳しい方の要件が適用 (Regulation 4, 3)	複数の混合物質のなかで、より厳しい方の要件が適用 (Regulation 6, 4)	

※※特別エリアにおける貨物倉洗浄水の海洋投棄のための特定の状況

以下の全ての条件が満たされる場合、陸上/氷棚から12海里以遠で洗浄水を排出することができる。

- ・貨物倉洗浄水に含まれる貨物残渣、洗剤、添加物が海洋環境に有害な物質を含まないこと。
- ・出航から目的地までの航海に特別エリア外の航行が含まれないこと。
- ・寄港地に適当な処理施設が存在しないこと。

なお、改正 Annex V(添付1)の Regulation 7 では一般除外規定が設けられています。同除外規定は船舶の地理的位置に関わらず適用されます。一般除外規定は緊急事態の際の対応を目的としており、以下の場合に認められます。

- ・船舶の安全確保もしくは海上での人命救助のために必要な排出である場合
- ・あらゆる妥当な事前注意を尽くしたにも関わらず船舶の損傷による廃棄物の偶発的な排出の場合
- ・あらゆる妥当な事前注意を尽くしたにも関わらず漁具の偶発的な排出の場合
- ・海洋環境の保護もしくは船舶や船員の安全のための船舶からの漁具の排出の場合

3.貨物残渣の海洋投棄：いかに改正 Annex V を遵守するか

貨物残渣：定義

「貨物残渣とは、貨物の積み降ろしのあとに甲板上又は貨物倉に残った貨物の残存物であって、条約の他の Annex で規制されないものをいう。貨物残渣には、積み降ろし時の余剰や漏出を含み、それが乾いているか湿っているかあるいは洗浄水に混入しているかを問わない。ただし、洗浄後に甲板上に残った貨物の塵または船体外表面の塵を除く。」(Regulation 1, Definitions ,2、添付 1 ご参照)

上記より、単なる貨物の塵は貨物残渣に該当しませんが、それ以外の貨物に関する物質は全て該当すると考えられます。

(a)特別エリア外での貨物残渣の扱い：排出の制限

排出可能なのは以下の場合に限られます。

「通常利用可能な揚荷手段を使って回収できない貨物残渣」(Regulation 4, 1.3、添付 1)

ガイドライン(添付 2)では、港湾、ターミナル、船舶オペレーターは本船上の残留貨物を軽減するために IMSBC Code に規定される Best Cargo-Handling Practices を遵守すべきとされています(3.5)。

貨物残渣が改正 Annex V Regulation 4 及び 6 に規定される除外物質とみなされるためには、IMSBC Code の義務が満たされなければなりません。

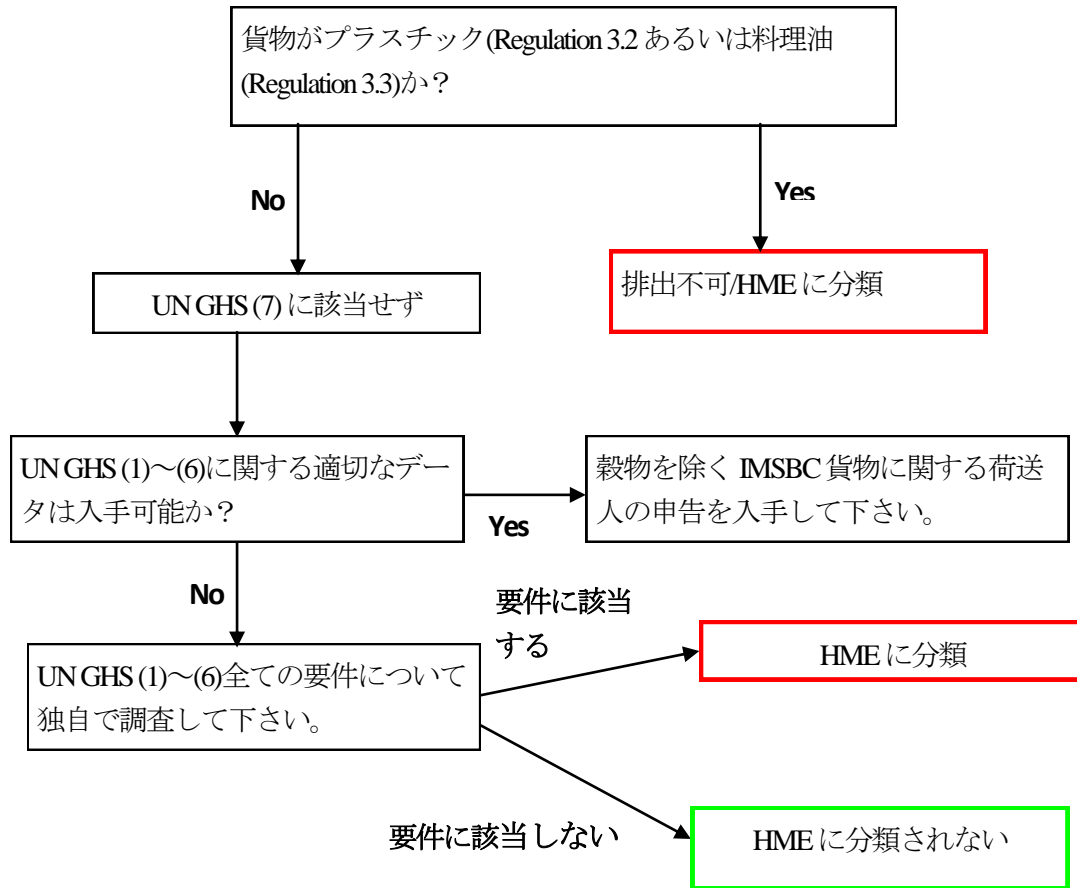
さらに、残渣は海洋環境に無害なものでなければなりません(Regulation 4, 1.3)。ガイドラインの 3.2 では、UN Globally Harmonised System 2011(UN GHS)の要件に従い分類される固体ばら積み物質の残渣である場合は有害とみなされるとしています。UN GHS によると、以下の 7 要件のいずれかに該当する場合、貨物は有害(HME)とみなされます。

- (1)急性水生毒性 カテゴリー1
- (2)慢性水生毒性カテゴリー1 もしくは 2
- (3)発がん性カテゴリー1A または 1B で急速に分解せず高い生物蓄積性を伴うもの
- (4)変異原性カテゴリー1A または 1B で急速に分解せず高い生物蓄積性を伴うもの
- (5)生殖毒性カテゴリー1A または 1B で急速に分解せず高い生物蓄積性を伴うもの
- (6)反復暴露標的臓器毒性カテゴリー1 で急速に分解せず高い生物蓄積性を伴うもの
- (7)合成ポリマー、ゴム、プラスチック、プラスチック原料ペレットを含む固体ばら積み貨物(粉碎、細断、浸軟されたもの、同種物質を含む)

同要件についての更なる詳細は右記のサイトにアクセスして下さい。 <http://www.unece.org/>

IMSBC Code の Section 4.2 では、固体ばら積み貨物の荷送人は積載される貨物の詳細な科学的性質を提示しなければならないと規定しています(穀物を除く)。

貨物残渣の排出に関する検討



もともと Annex V に関する固体ばら積み貨物のリストがなく、貨物の分類が難しい場合があります。IMO もサーキュラー(Amendment、添付 4)でこれを認めています。

サーキュラーは以下のリンクからダウンロードできます。

<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Documents/2014%20revision/MEPC.1-Circ.791.pdf>

しかし、2016年4月22日開催 IMO 海洋環境保護委員会(MEPEC)にて、有害固体ばら積み貨物を含む貨物倉洗浄水を特別エリア外において排出できないことが決議されました。それまでは、港に有害残渣の受入施設が整っていない場合、特定の条件下では排出が認められていました。

現在、IMO は加盟国に対して、有害残渣受入施設が不十分な港を報告するよう求めており、また、かかる問題のあることを関係者へ周知すべく MEPEC に報告することを検討しています。

IMSBC Code では積載する貨物の詳細を提供する義務を荷送人に課しています。しかしながら、現実的には常に当該データを手に入れるとは限りません。この点、GESAMP(The Group of Experts on Scientific Aspects of Marine Pollution)が、海洋環境に有害とみなされる可能性のある物質のリスト(添付 5)を作成しています。なお、リストは以下のリンクからダウンロードできます。

<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/ChemicalPollution/Documents/GESAMP%20CompList%202015.pdf>

但し、GESAMP のガイダンスを確定的証拠として用いることはできません。貨物残渣について不十分なデータしか入手できないことから分析実施が必要になる場合、UN GHS 要件に沿った分析所を起用する必要があります。

(b)特別エリア内での貨物残渣の扱い：排出の制限

特別エリア内での排出は以下の場合に限られます。

「通常利用可能な揚荷手段を使って回収できない貨物残渣で以下の条件を全て満たすもの：

貨物倉洗浄水に含まれる貨物残渣、洗剤、添加物に IMO のガイドラインに従い海洋環境に有害と分類される物質が含まれないこと。

本項 2.1、2.2 及び 2.3 の条件を満たした場合、貨物残渣を含む貨物倉洗浄水を領海の基線から出来るだけ以遠で排出可能。」(Regulation 6, 1.2)

上記より、貨物残渣を含む貨物倉洗浄水のみ特別エリア内で排出することが可能です。

なお、サーキュラー(添付 4)は特別エリア外での貨物残渣の排出にのみ適用されます。従いまして、有害性が疑われる場合には特別エリア内での海洋投棄はできません。

(c)事例検討：揚荷後に甲板に残った丸太の残渣である樹皮の場合

樹皮は上記貨物残渣の定義に該当する貨物残渣と考えられます。

特別エリア内での海洋投棄：

改正 Annex V の目的に則り、貨物残渣は海洋投棄でなく陸上で処理されるべきであり、海洋投棄は最終手段でなければなりません。

まず、樹皮が通常利用可能な揚荷手段を使って回収できるかどうかの検討が必要です(添付 1、Regulation 4, 1.3)。

IMSBC Code では揚荷について特段の要求を規定していません。従って、全体の揚荷役を実施する際にどの港でも樹皮を陸揚げすることが可能なはずで。

次に、貨物が海洋環境に有害と分類されるかどうか検討する必要があります。一見したところ樹皮は環境に有害とは思われません。しかしながら、現地もしくは国際的な植物検疫規則(例えば ISPM No 15)で船積み前に木材貨物の燻蒸が必要とされている場合があります。有毒な燻蒸剤が樹皮に残っている可能性があり、貨物残渣を有害にする可能性があります。

その場合には、樹皮は特別エリア外で海洋投棄することはできません(特別エリア内でも同様です)。

上記より、各貨物残渣は各々の状況により検討される必要があります。樹皮の場合、燻蒸剤により海洋環境に有害な貨物になる可能性があります。疑わしい場合には、排出前に船員は陸上の技術スタッフに相談すべきです。

(d)組員が取るべき対応

船員が改正 Annex V の義務を十分に認識するよう、組員各位におかれましては廃棄物管理マニュアルを作成されることをお勧め致します。その際には廃棄物管理計画策定のためのガイドライン(添付 3)をご参照下さい。当該廃棄物管理計画を遵守することで、改正 Annex V を遵守するための相当な注意義務を尽くしていることを示すことにつながると考えられます。また、トレーニングを行いその記録を残しておくことも有益と思われれます。疑わしい場合には、船員は陸上スタッフに相談すべきです。陸上スタッフは場合によっては寄港地の当局に照会することも必要になるかもしれません。

4.Marpol Annex V 違反の罰則

規則の実施についてはガイドライン(添付 2)に規定されています。

「政府は Annex V に規定する目的達成のため責任を持ってコンプライアンスを実施、促進し、法的権限、適切なトレーニング、資金及び設備を提供するための適当な機関を任命する」(Regulation 6.2.3)

従いまして、実施は個々の締約国の法律で規定されます。各国の Port State Control を実施する部署が各国の当局となります。その当局が罰則を決定します。

5.過怠金のおてん補について

保険契約規定の第 31 条が関係する条項になります。なお、過怠金防止のための適切な手段を講じることを怠った場合、おてん補に支障が生じる可能性があります。

最後に、上記「組員が取るべき対応」に記載した改正 Annex V を遵守するためのあらゆる必要な予防措置を取ることを推奨致します。また、改正 Annex V を遵守した指示を出すことを用船者に義務付ける用船契約条項について法的助言を得ることを検討されることもあわせてお勧め致します。

以上

添付 1 : 改正 Annex V

添付 2 : Marpol Annex V 実施のためのガイドライン

添付 3 : 廃棄物管理計画策定のためのガイドライン

添付 4 : 改正 Annex V における固体ばら積み貨物の分類に関する IMO サーキュラー

添付 5 : GESAMP 作成有害物質リスト

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.

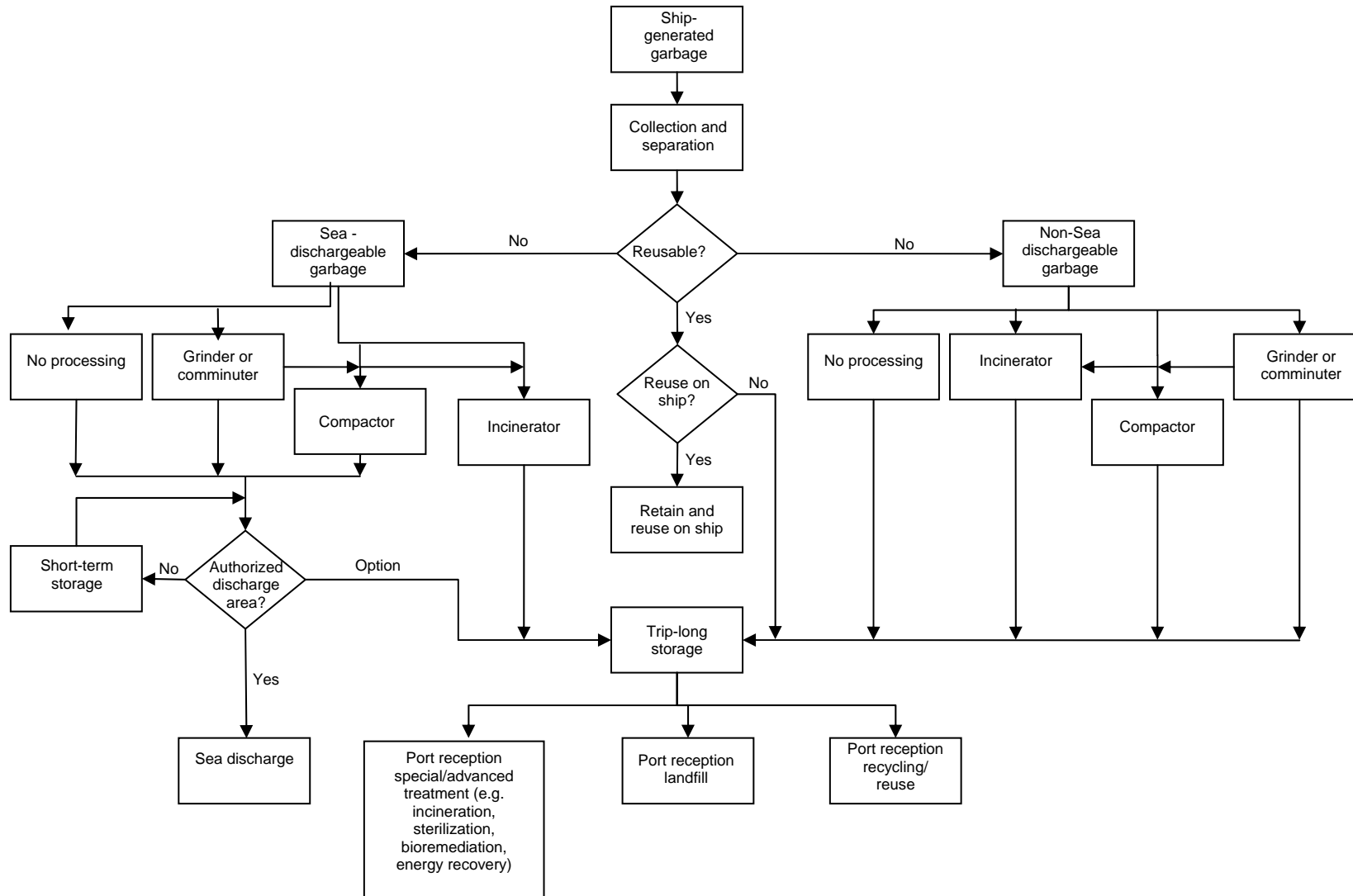
2.3.3 Compliance with the provisions of Annex V involves careful planning by the ship's owner and operator and proper execution by crew members as well as other seafarers. The most appropriate procedures for handling and storing garbage on board ships may vary depending on factors such as the type and 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.791
18 October 2012

IMPLEMENTATION OF MARPOL ANNEX V

Provisional classification of solid bulk cargoes under the revised MARPOL Annex V between 1 January 2013 and 31 December 2014

1 The Marine Environment Protection Committee, at its sixty-fourth session (1 to 5 October 2012), having considered the challenges associated with the classification of solid bulk cargoes and discharge of associated cargo residues in accordance with the requirements of the revised MARPOL Annex V which will enter into force on 1 January 2013; having taken into account paragraph 3.2 of the *2012 Guidelines for the implementation of MARPOL Annex V* (2012 Guidelines); and further recognizing that a transitional period for the implementation of this aspect of MARPOL Annex V would greatly facilitate maritime trade of solid bulk cargoes with minimal additional risk to the marine environment, decided that (MEPC 64/23, paragraphs 7.29 to 7.31):

- .1 for the purposes of complying with regulations 4.1.3 and 6.1.2 of the revised MARPOL Annex V, shippers of solid bulk cargoes should classify those cargoes using the seven criteria in paragraph 3.2 of the *2012 Guidelines for the implementation of MARPOL Annex V*. Shippers should notify the competent authorities of the port State of loading and unloading of the basis for the provisional classification. As stated in paragraph 3.4 of the 2012 Guidelines, 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 as to whether or not the cargo is harmful to the marine environment should be included in the information required in section 4.2 of the International Maritime Solid Bulk Cargoes Code;
- .2 between 1 January 2013 and 31 December 2014, if adequate and reliable data on a solid bulk cargoes carcinogenicity, mutagenicity, reproductive toxicity, or specific target organ toxicity – repeated exposure are not available, shippers of solid bulk cargoes should still make every effort to ensure that their solid bulk cargoes are classified to the extent possible using the seven criteria in paragraph 3.2 of the 2012 Guidelines;
- .3 also, between 1 January 2013 and 31 December 2014, while shippers are acquiring adequate and reliable data on a solid bulk cargoes carcinogenicity, mutagenicity, reproductive toxicity or specific target organ toxicity – repeated exposure, Administrations should accept provisional classifications of solid bulk cargoes that are based on the other criteria as contained in paragraphs 3.2.1, 3.2.2 and 3.2.7 of the 2012 Guidelines:
 - data concerning acute aquatic toxicity; and/or
 - data concerning chronic aquatic toxicity; and/or

- data concerning the synthetic polymer, rubber, plastic or plastic feedstock content of the solid bulk cargoes; and

.4 as of 1 January 2015, shippers' classifications of solid bulk cargoes should be made using the seven criteria listed in paragraph 3.2 of the 2012 Guidelines.

2 Parties to MARPOL Annex V are requested to ensure the provision of adequate facilities at ports and terminals for the reception of solid bulk cargo residues including those entrained in the wash water.

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

GESAMP Composite List

2015

Issued May 2015 as PPR.1/Circ.2. Replaces all previous versions.

ANNEX 4

**GESAMP HAZARD PROFILES FOR NEW SUBSTANCES
SUBMITTED FOR EVALUATION TO GESAMP/EHS 52**

This annex sets out the GESAMP Hazard Profiles (GHP) assigned for the products submitted to the current session. The respective substances and their GHPs are summarized in the subsequent table.

ANNEX 4 - Evaluation of new products proposed for bulk transport

EHS Name TRN Name	EHS TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Cresol/Phenol/Xylenol mixture	2471	(2)	(2)	(2)	R	(3)	(1)	1	2	3	3B	3				
	3673															
Cyclohexane-1,2-dicarboxylic acid, diisononyl ester	2472	0	3	3	R	0	0	0	0	(1)	1	0			Fp	2
Cyclohexane-1,2-dicarboxylic acid, diisononyl ester	3915										166412-78-8					
2,6-Diaminohexanoic acid phosphonate mixed salts solution	2469	1	NI	1	NR	1	(0)	(1)	(1)	(3)	(3)	(3)	T		D	3
	3989															
1-Dodecene	2473	5	NI	5	R	0	NI	0	0	1	2	1	A		F	3
	3990										112-41-4					
Triglycerides, C16-C18 and C18 unsaturated, reclaimed (UCO)	2470	(5)	NI	(5)	R	(0)	(0)	(0)	(0)	(1)	(1)	(1)			Fp	2
Used cooking oil (m)	3974										68990-65-8					

ANNEX 5

UPDATED GESAMP COMPOSITE LIST

Notes:

- 1 In the Composite List, both EHS and TRN (shipping) names are shown for each product. The alphabetical listing of the products is based on the EHS names.
- 2 Any changes introduced in the table since the last issue of the Composite List are highlighted.
- 3 Entries with an EHS name marked with a single asterisk (*) represent cleaning additive components that have only a partial hazard profile assigned. These profiles **cannot be used** for mixture calculations in relation to bulk shipments.
- 4 Entries with an EHS name marked with a double asterisk (**) represent mixture components for which only a partial hazard profile has been assigned. These profiles **may be used** for mixture calculations in relation to bulk shipments.
- 5 Entries with an EHS name marked with a hash mark (#) reflect that for the **C3 rating**, the product, as a vapour rather than an aerosol or mist, could be considered to have a lower inhalation hazard for the purposes of risk management.
- 6 Entries with an EHS name marked with an exclamation mark (!) refer to a mixture that contains components with substantially different physical properties and therefore different physical behaviours when released in the marine environment. The **E2 rating** assigned reflects the most severe impact from an environmental standpoint. For example, a mixture assigned a rating of Fp may also have a major component(s) with sinker characteristics (S) or dissolver characteristics (D).

**ANNEX 5 - GESAMP/EHS COMPOSITE LIST
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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								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								CAS No		108-24-7						
Acetochlor (ISO)	2047	3	2	2	NR	4	NI	1	0	(1)	0	0				S	2
Acetochlor	66								CAS No		34256-82-1						
Acetone	15	0	0	0	R	0	0	0	0	0	1	2		NT	DE		2
Acetone	67								CAS No		67-64-1						
Acetone cyanohydrin	14	0	0	0	R	4	NI	3	4	3	(3)	(3)				D	3
Acetone cyanohydrin	68								CAS No		75-86-5						
Acetonitrile	16	0	0	0	R	1	NI	1	1	2	1	2				D	2
Acetonitrile	69								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								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								CAS No								
Acrylamide	23	0	0	0	R	2	0	2	2	(2)	1	2	CMNSs			D	3
Acrylamide solution (50% or less)	70								CAS No		79-06-1						
Acrylic acid	24	0	0	0	R	4	NI	2	2	2	3C	3				D	3
Acrylic acid	71								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								CAS No								
Acrylic acid/ethenesulphonic 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/ethenesulphonic acid copolymer with phosphonate groups, sodium salt solution	3693								CAS No								
Acrylonitrile	25	0	2	2	NR	3	0	2	3	3	2	2	CMSS	NT	DE		3
Acrylonitrile	72								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								CAS No								

**ANNEX 5 - GESAMP/EHS COMPOSITE LIST
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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	
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								CAS No		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								CAS No								
Alkyl dithio thiadiazole (C6-C24) (LOA)	1981	5	NI	5	NR	1	NI	0	0	(0)	0	0				S	2
Alkyl dithio thiadiazole (C6-C24)	104								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								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								CAS No								
Alkyl naphthalenes, crude (containing naphthalene)	2426	(4)	(4)	(4)	(R)	(4)	NI	0	0	(1)	1	1	AC			F	3
Alkyl naphthalenes (containing naphthalenes), crude	3699								CAS No								
Alkyl (C7-C9) nitrates	8	4	NI	4	NR	3	NI	0	0	(3)	2	(3)				F	3
Alkyl (C7-C9) nitrates	93								CAS No								
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								CAS No								
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								CAS No								
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								CAS No								
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								CAS No		141464-42-8						
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								CAS No		141464-42-8						
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								CAS No		68515-73-1						
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								CAS No								
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								CAS No		110615-47-9						

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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	
Alkyl(C12-C14)polyglucoside solution (max 55% active material)	2137	3	NI	3	R	3	0	0	0	0	(3)	2	3			D	3
Lauryl polyglucose (50% or less)	416								CAS No		110615-47-9						
Alkylsulphonic acid ester of phenol (MESAMOLL)	1878	5	NI	5	NR	0	NI	0	0	(0)	0	0	0			S	0
Alkyl sulphonic acid ester of phenol	1701								CAS No		91082-17-6						
Alkyltoluenes	2374	0	2	2	NR	0	NI	0	(0)	(1)	0	1				Fp	2
Alkyl (C18+) toluenes	3148								CAS No								
Alkyl(C18-C28)toluenesulphonic acid (>90% in mineral oil)	2429	0	4	4	NR	3	NI	0	0	(3)	2	3		Ss		Fp	3
Alkyl(C18-C28)toluenesulphonic acid	3658								CAS No								
Alkyl(C18-C28)toluenesulphonic acid, calcium salts, borated (up to 70% in mineral oil)	2404	0	4	4	NR	0	NI	(0)	(0)	(1)	(1)	(1)		Ss		S	2
Alkyl(C18-C28)toluenesulphonic acid, calcium salts, borated	3661								CAS No								
Alkyl(C18-C28)toluenesulphonic acid, calcium salts, high overbase (up to 70% in mineral oil)	2373	(0)	(4)	(4)	(NR)	(0)	NI	0	0	(0)	0	0		Ss		S	2
Alkyl (C18-C28) toluenesulphonic acid, calcium salts, high overbase	3149								CAS No								
Alkyl(C18-C28)toluenesulphonic acid, calcium salts, low overbase (up to 60% in mineral oil)	2409	0	4	4	NR	0	NI	0	0	(2)	2	0		Ss		Fp	3
Alkyl (C18-C28) toluenesulphonic acid, calcium salts, low overbase	3685								CAS No								
Allyl alcohol	28	0	0	0	R	4	NI	2	3	3	2	3		A		D	3
Allyl alcohol	105								CAS No		107-18-6						
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								CAS No								
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								CAS No								
Aluminium sulphate solution	2205	Inorg	Inorg	2	Inorg	3	1	1	(0)	(3)	(2)	(3)				D	3
Aluminium sulphate solution	111								CAS No								
2-(2-Aminoethoxy) ethanol	75	0	0	0	NR	1	0	0	1	(3)	3	3				D	3
2-(2-Aminoethoxy) ethanol	37								CAS No		929-06-6						
Aminoethylethanolamine	68	0	0	0	NR	1	0	0	0	(3)	3B	2		SsSr		D	3
Aminoethyl ethanolamine	112								CAS No		111-41-1						
Aminoethylethanolamine/Aminoethyldiethanolamine solution	74	Inorg	0	0	NR	1	0	(0)	(0)	(3)	(3B)	(2)		SsSr		D	3
Aminoethyldiethanolamine/Aminoethylethanolamine solution	113								CAS No								
N-Aminoethylpiperazine	88	0	0	0	NR	1	NI	0	2	(3)	3	3		Ss		D	3
N-Aminoethylpiperazine	472								CAS No		140-31-8						

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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
2-Amino-2-(hydroxymethyl)-1,3-propanediol solution(40% or less)	89	0	NI	0	NI	1	NI	0	0	NI	NI	NI				NI
2-Amino-2-hydroxymethyl-1,3-propanediol solution (40% or less)	38								CAS No	77-86-1						
2-Amino-2-methyl-1-propanol	90	0	0	0	NR	1	NI	0	0	(3)	3	3				DE
2-Amino-2-methyl-1-propanol	39								CAS No	124-68-5						
Ammonia (anhydrous and aqueous, 28% or less)	91	0	0	0	R	3	2	1	(2)	3	3	3				DE
Ammonia aqueous (28% or less)	114								CAS No	7664-41-7						
Ammonium bisulphite solution, greater than 15%	1730	NI	NI	NI	NI	1	NI	NI	NI	NI	2	2				D
Ammonium bisulphite solution (70% or less)	115								CAS No	10192-30-0						
Ammonium chloride solution (less than 25%)	2388	0	NI	0	Inorg	1	0	0	(0)	(2)	2	2				D
Ammonium chloride solution (less than 25%) (*)	3411								CAS No	12125-02-9						
Ammonium lignosulphonate (46% solution in water)	2086	0	NI	0	NR	0	NI	0	(0)	(0)	0	0				D
Ammonium lignosulphonate solutions	118								CAS No	8061-53-0						
Ammonium nitrate solutions	1912	Inorg	0	0	Inorg	1	NI	0	0	(2)	1	2				D
Ammonium nitrate solution (93% or less)	119								CAS No							
Ammonium polyphosphate solution	1764	Inorg	0	0	Inorg	1	NI	0	0	0	1	0				D
Ammonium polyphosphate solution	120								CAS No	10-34-0						
Ammonium sulphate	99	0	0	0	Inorg	1	(0)	0	(0)	(0)	0	0				D
Ammonium sulphate solution	121								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
Ammonium sulphide solution (45% or less)	122								CAS No	12124-99-1						
Ammonium thiocyanate/ Ammonium thiosulphate solution	1732	Inorg	0	0	Inorg	1	NI	1	NI	NI	NI	NI				D
Ammonium thiocyanate (25% or less)/Ammonium thiosulphate (20% or less) solution	123								CAS No							
Ammonium thiosulphate solution (60% or less)	312	Inorg	0	0	Inorg	1	NI	0	(0)	(1)	(1)	(1)				D
Ammonium thiosulphate solution (60% or less)	124								CAS No	7783-18-8						
Amyl acetate	255	2	2	2	NR	2	NI	0	(0)	0	1	1		NT	FED	2
Amyl acetate (all isomers)	125								CAS No	628-63-7						
tert-Amyl ethyl ether	2428	3	NI	3	NR	1	NI	0	(0)	0	2	2				E
tert-Amyl ethyl ether	3623								CAS No							
tert-Amyl methyl ether	2141	1	NI	1	NI	4	NI	1	0	(2)	0	1				ED
tert-Amyl methyl ether	2210								CAS No							

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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	
Amyl propionate	1484	2	NI	2	R	2	NI	0	0	(2)	2	1				F	2
n-Pentyl propionate	484								CAS No	624-54-4							
Aniline	261	0	0	0	R	3	2	2	2	3	1	3	CTSs	NT	FD	3	
Aniline	127								CAS No	62-53-3							
Apple juice	275	0	NI	0	R	0	0	0	0	0	0	0				D	0
Apple juice	130								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								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								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
Aviation alkylates (C8 paraffins and iso-paraffins BPT 95 - 120°C)	132								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								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 (C-11-C50) alkaryl sulphonate	2370								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								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								CAS No								
Benzene sulphonyl chloride	320	1	1	1	R	3	NI	1	(2)	(3)	3	3	Ss			SD	3
Benzene sulphonyl chloride	134								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								CAS No								
Benzyl acetate	348	1	NI	1	R	3	1	1	0	2	1	1				SD	2
Benzyl acetate	138								CAS No	140-11-4							
Benzyl alcohol	349	1	NI	1	R	2	NI	1	1	2	2	2				SD	2
Benzyl alcohol	139								CAS No	100-51-6							
Benzyl chloride	352	NI	1	1	R	3	1	1	(2)	3	3	3	CSsA			S	3
Benzyl chloride	140								CAS No	100-44-7							

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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	
Bis(2-ethylhexyl) terephthalate	2437	0	3	3	R	0	0	0	0	(1)	1	1				Fp	2
Bis(2-ethylhexyl) terephthalate	3752								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								CAS No								
Bis[3-(triethoxysilyl)propyl]amine	2444	1	NI	1	R	1	NI	0	0	(2)	2	2				D	2
	3823								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								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								CAS No	10043-35-3							
Bromochloromethane	2084	1	1	1	NR	1	NI	0	0	0	1	0				SD	1
Bromochloromethane	145								CAS No	74-97-5							
1-Bromopropane	2229	2	NI	2	NI	NI	NI	0	(0)	0	(2)	(2)				SD	2
1-Bromopropane	2696								CAS No								
Butanol	381	0	(0)	0	R	0	NI	0	0	0	2	3			NT	D	3
n-Butyl alcohol	474								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								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								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								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								CAS No	78-93-3							
Butene oligomer	386	0	NI	0	NR	(4)	0	0	0	0	0	1			FE	2	
Butene oligomer	146								CAS No								
Butyl acetate	387	1	NI	1	R	2	NI	0	0	0	0	1			FED	2	
Butyl acetate (all isomers)	147								CAS No	123-86-4							
Butyl acrylate	390	2	NI	2	R	3	NI	1	1	1	2	2	SsA		FED	2	
Butyl acrylate (all isomers)	148								CAS No	141-32-2							

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Butylamine	392	0	NI	0	R	2	NI	2	2	3	3C	3				DE	3
Butylamine (all isomers)	154								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								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								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								CAS No		109-21-7						
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	2295	(5)	NI	(5)	(R)	(3)	NI	0	0	0	2	2	Ss			FE	2
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	153								CAS No								
Butylene glycol(s)	402	0	NI	0	R	1	NI	1	0	0	0	0				D	1
Butylene glycol	156								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								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								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								CAS No		106-88-7						
Butyl methacrylate	409	2	NI	2	NR	1	NI	0	0	0	2	2	Ss			FE	2
Butyl methacrylate	151								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								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								CAS No								
Butyl propionate	1483	2	NI	2	R	2	NI	0	0	0	1	1				FED	2
n-Butyl propionate	476								CAS No		590-01-2						
Butyl stearate	413	0	NI	0	(R)	0	NI	0	NI	NI	2	NI				Fp	2
Butyl stearate	152								CAS No		123-95-5						
Butyraldehyde	416	1	NI	1	R	2	0	0	1	0	3	3				DE	3
Butyraldehyde (all isomers)	157								CAS No		123-72-8						

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Calcium long-chain alkyl phenolic amine (C8-C40)	1728	NI	NI	NI	NR	0	NI	0	0	(1)	1	(1)				Fp	2
	171	CAS No															
Calcium long-chain alkyl (C18-C28) salicylate	2383	0	NI	0	NR	0	NI	0	0	(1)	1	0	Ss			Fp	3
Calcium long-chain alkyl (C18-C28) salicylate	3426	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	CAS No															
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	CAS No															
Camelina oil	2440	(0)	NI	(0)	(R)	(0)	(0)	(0)	(0)	(1)	(0)	(1)				Fp	2
Camelina oil	3767	CAS No															
Camphor oil, white	1897	NI	NI	NI	NI	NI	NI	2	NI	(2)	1	NI		(T)		FE	2
Camphor oil	174	CAS No															
Caprolactam	436	0	NI	0	R	1	0	1	1	2	1	2				D	3
epsilon-Caprolactam (molten or aqueous solutions)	310	CAS No															
Carbolic oil	437	(3)	3	(3)	(NR)	(3)	(1)	2	2	3	3	3	ATNCM			FED	3
Carbolic oil	176	CAS No															
Carbon disulphide	439	2	1	1	NR	3	NI	2	(3)	4	3A	3	RN			SD	3
Carbon disulphide	177	CAS No															
Cashew nut shell oil (untreated)	443	0	NI	0	R	0	NI	(0)	(0)	(2)	2	(2)	Ss			Fp	3
Cashew nut shell oil (untreated)	179	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	CAS No															
Cesium Formate, drilling brines	2384	0	3	3	Inorg	2	NI	1	0	(2)	2	2				D	2
Cesium formate solution (*)	3421	CAS No															
Cetyl/Eicosyl methacrylate (mixture)	445	0	NI	0	(NR)	(0)	NI	0	(0)	(1)	(1)	(1)				Fp	2
Cetyl/Eicosyl methacrylate mixture	180	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	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	CAS No															

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Chlorinated paraffins (C10- C13) with less than 60% chlorine	2020	5	5	5	NR	5	3	(0)	(0)	(1)	(1)	(1)	C	S	S	3
Chlorinated paraffins (C10-C13) (60% chlorine or less)	2832								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	S	3
Chlorinated paraffins (C14-C17) (with 50% chlorine or more, and less than 1% C13 or shorter chains)	182								CAS No							
Chloroacetic acid	450	0	NI	0	R	2	0	2	3	(4)	3C	3	A	D	D	3
Chloroacetic acid (80% or less)	184								CAS No	79-11-8						
Chlorobenzene	456	2	2	2	NR	3	0	1	0	2	2	0		S	S	2
Chlorobenzene	185								CAS No	108-90-7						
Chlorohydrins	463	0	NI	0	R	0	NI	(2)	(2)	(3)	(3A)	3	C	D	D	3
Chlorohydrins (crude)	187								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)	C	D	D	3
N-(3-Chloro-2-hydroxypropyl)trimethyl ammonium chloride solution (75% or less)	2579								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								CAS No							
Chloronitrobenzenes	467	2	2	2	NR	3	NI	2	2	2	1	1		S	S	2
o-Chloronitrobenzene	533								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	S	1
1-(4-Chlorophenyl)-4,4- dimethyl-pentan-3-one	21								CAS No							
2-Chloropropionic acid	474	0	NI	0	R	1	NI	1	(3)	2	3A	3		D	D	3
2- or 3-Chloropropionic acid	36								CAS No	598-78-7						
3-Chloropropylene	478	1	1	1	R	3	NI	1	0	2	1	3	T	E	E	3
Allyl chloride	106								CAS No	107-05-1						
Chlorosulphonic acid	479	Inorg	0	0	Inorg	2	NI	(2)	(3)	4	3C	3		D	D	3
Chlorosulphonic acid	188								CAS No	7790-94-5						
m-Chlorotoluene	481	3	NI	3	NR	2	NI	2	0	(2)	1	1		S	S	2
m-Chlorotoluene	426								CAS No	108-41-8						
o-Chlorotoluene	480	3	3	3	NR	3	1	0	0	0	1	1		S	S	1
o-Chlorotoluene	534								CAS No	95-49-8						
o-Chlorotoluene	480	3	3	3	NR	3	1	0	0	0	1	1		S	S	1
Chlorotoluenes (mixed isomers)	189								CAS No	95-49-8						

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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								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								CAS No								
Corn oil	521	0	NI	0	R	(2)	NI	0	(0)	(1)	1	1				Fp	2
Corn Oil	2781								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								CAS No	8001-29-4							
Creosote (coal tar)	524	(4)	(4)	(4)	NR	4	(2)	1	0	2	2	1	CM	(T)	S		3
Creosote (coal tar)	199								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								CAS No	8021-39-4							
Cresol/Phenol/Xylenol mixture	2471	(2)	(2)	(2)	R	(3)	(1)	1	2	3	3B	3				SD	3
	3673								CAS No								
Cresols (mixed isomers)	527	2	2	2	R	3	(1)	2	2	4	3A	3		T	SD		3
Cresols (all isomers)	201								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								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								CAS No								
Crotonaldehyde	528	0	NI	0	NR	4	1	2	4	4	2	3				D	3
Crotonaldehyde	204								CAS No	4170-30-3							
Crude Piperazine	2331	0	NI	0	R	2	NI	(1)	(2)	(3)	3	3	SsSr		D		3
Crude Piperazine	2810								CAS No								
Crude Tall Oil	2357	4	NI	4	R	2	0	0	0	(0)	0	0	Ss		Fp		3
Tall oil, crude	3118								CAS No								
1,5,9-Cyclododecatiene	534	5	5	5	NR	4	NI	0	0	1	2	1	A		F		3
1,5,9-Cyclododecatiene	17								CAS No	4904-61-4							
Cycloheptane	535	4	NI	4	(NR)	4	NI	(0)	0	(1)	(0)	(1)			FE		2
Cycloheptane	205								CAS No	291-64-5							

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Cyclohexane	536	3	3	3	NR	3	NI	0	0	1	0	1				E	2
Cyclohexane	206								CAS No		110-82-7						
Cyclohexane-1,2-dicarboxylic acid, diisononyl ester	2472	0	3	3	R	0	0	0	0	(1)	1	0				Fp	2
Cyclohexane-1,2-dicarboxylic acid, diisononyl ester	3915								CAS No		166412-78-8						
Cyclohexane oxidation products, sodium salts solution	2458	0	NI	0	Inorg	1	0	0	(0)	(0)	0	0				D	0
Cyclohexane oxidation products, sodium salts solution	3739								CAS No								
Cyclohexanol	537	1	NI	1	R	2	NI	0	0	0	2	2				Fp	2
Cyclohexanol	207								CAS No		108-93-0						
Cyclohexanone	539	0	1	1	R	1	0	1	1	1	2	2				FE	2
Cyclohexanone	208								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								CAS No								
Cyclohexyl acetate	541	2	NI	2	(R)	(2)	NI	0	0	(2)	2	1				FED	2
Cyclohexyl acetate	210								CAS No		622-45-7						
Cyclohexylamine	542	1	NI	1	R	2	NI	2	2	3	3	3				D	3
Cyclohexylamine	211								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								CAS No		77-73-6						
Cyclopentane	546	3	NI	3	NR	3	NI	(0)	(0)	0	1	(1)				E	2
Cyclopentane	212								CAS No		287-92-3						
Cyclopentene	547	2	NI	2	(R)	3	NI	1	1	0	2	(0)	A			E	2
Cyclopentene	213								CAS No		142-29-0						
Decahydronaphthalene	551	4	4	4	NR	3	NI	0	0	2	2	1				F	1
Decahydronaphthalene	214								CAS No		91-17-8						
Decane	554	5	NI	5	R	0	0	0	0	0	1	0				F	1
Decane	2620								CAS No		124-18-5						
Decanoic acid	555	4	NI	4	R	4	1	0	0	(2)	2	2				Fp	2
Decanoic acid	215								CAS No		334-48-5						
1-Decene	558	5	NI	5	R	4	2	0	0	0	2	0	A			F	3
Decene	216								CAS No		872-05-9						

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Decyl acetate	1767	4	NI	4	NI	NI	NI	0	0	(1)	(1)	(1)				F	1
Decyl acetate	217								CAS No	112-17-4							
Decyl acrylate	559	5	NI	5	(R)	5	NI	0	0	(2)	2	1				Fp	2
Decyl acrylate	218								CAS No	2156-96-9							
Decyloxytetrahydrothiophene dioxide	1859	3	NI	3	NR	4	NI	0	0	(1)	1	0				Fp	2
Decyloxytetrahydrothiophene dioxide	220								CAS No								
Dextrose solution	562	0	0	0	R	0	NI	0	0	0	0	(0)				D	0
Dextrose solution	221								CAS No	50-99-7							
Dextrose solution	562	0	0	0	R	0	NI	0	0	0	0	(0)				D	0
Glucose solution	361								CAS No	50-99-7							
Diacetone alcohol	563	0	NI	0	R	1	0	0	0	(2)	2	2				D	2
Diacetone alcohol	226								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								CAS No								
Dialkyl (C9 - C10) phthalates	2359	(0)	(0)	(0)	(R)	(0)	(0)	(0)	(0)	(1)	(1)	(1)				Fp	2
Dialkyl (C9 - C10) phthalates	3121								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								CAS No								
2,6-Diaminohexanoic acid phosphonate mixed salts solution	2469	1	NI	1	NR	1	(0)	(1)	(1)	(3)	(3)	(3)	T			D	3
	3989								CAS No								
Diammonium hydrogen phosphate	98	0	0	0	Inorg	1	NI	0	0	(0)	(1)	(1)				D	1
Ammonium hydrogen phosphate solution	117								CAS No	7783-28-0							
Dibromomethane	574	1	NI	1	NR	(2)	NI	1	0	0	(2)	(2)				SD	2
Dibromomethane	228								CAS No	74-95-3							
Di-n-butylamine	577	2	NI	2	R	3	NI	2	2	3	3	3				FD	3
Dibutylamine	231								CAS No	111-92-2							
Di-butyl ether	578	3	3	3	NR	2	NI	0	0	0	1	1				FE	2
n-Butyl ether	475								CAS No	142-96-1							
Dibutyl hydrogen phosphonate	1857	1	NI	1	NI	2	NI	0	0	(3)	3	3				F	3
Dibutyl hydrogen phosphonate	229								CAS No	1809-19-4							

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2,4-Di-tert-butyl phenol	2083	5	4	4	NR	4	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
2,4-Di-tert-butylphenol	2339								CAS No	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								CAS No	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								CAS No	84-74-2						
Dibutyl terephthalate	2430	5	(3)	(3)	R	4	2	0	0	(0)	0	0			S	0
Dibutyl terephthalate	3596								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								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								CAS No	760-23-6						
1,1-Dichloroethane	590	1	NI	1	NR	1	NI	1	(1)	0	2	2			SD	2
1,1-Dichloroethane	4								CAS No	75-34-3						
1,2-Dichloroethane	591	1	1	1	NR	2	0	1	0	2	1	2	C		SD	3
Ethylene dichloride	330								CAS No	107-06-2						
1,6-Dichlorohexane	593	3	NI	3	NR	3	NI	0	(0)	(0)	0	0			S	0
1,6-Dichlorohexane	19								CAS No	2163-00-0						
Dichloromethane	594	1	2	2	NR	1	0	1	0	0	2	2	C		SD	3
Dichloromethane	234								CAS No	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								CAS No	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								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								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								CAS No							
1,1-Dichloropropane	605	2	1	1	NR	2	1	0	0	1	1	1			SD	1
1,1-Dichloropropane	5								CAS No	78-99-9						

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1,2-Dichloropropane	606	2	1	1	NR	2	0	1	0	2	2	2				SD	2
1,2-Dichloropropane	9								CAS No		78-87-5						
1,3-Dichloropropane	607	2	1	1	NR	2	1	0	NI	NI	NI	NI				SD	NI
1,3-Dichloropropane	12								CAS No		142-28-9						
Dichloropropane and dichloropropene, mixture	608	(2)	(1)	(1)	(NR)	(4)	(1)	2	1	2	3	3	CSs			SD	3
Dichloropropene/Dichloropropane mixtures	235								CAS No		8003-19-8						
1,3-Dichloropropene	612	1	NI	1	NR	4	1	2	1	2	3	3	CSs			SD	3
1,3-Dichloropropene	13								CAS No		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								CAS No		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								CAS No		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								CAS No								
Diethanolamine	620	0	NI	0	R	1	0	1	0	0	2	3	T			D	3
Diethanolamine	236								CAS No		111-42-2						
Diethylamine	621	0	NI	0	R	2	NI	1	2	3	3C	3				DE	3
Diethylamine	240								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								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								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								CAS No		84-75-3						
Diethylene glycol	628	0	NI	0	R	0	0	1	0	2	1	1				D	2
Diethylene glycol	243								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								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								CAS No		112-36-7						

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Diethylene glycol initiated polyoxypropylene diamine	2353	0	NI	0	NR	2	NI	0	0	(3)	3B	(3)		D		3
Polyetheramine	2946								CAS No							
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								CAS No							
Diethylene glycol phthalate	1438	2	NI	2	NR	1	NI	0	0	(2)	(1)	2		S		2
Diethylene glycol phthalate	247								CAS No							
Diethylene triamine	638	0	1	1	(R)	2	NI	1	3	3	3A	3	Ss	FD		3
Diethylenetriamine	248								CAS No		111-40-0					
Diethylenetriamine pentaacetic acid, pentapotassium salt solution (40%) (**)	2466	1	NI	1	NR	2	NI	NI	NI	NI	NI	NI		D		NI
	3929								CAS No							
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								CAS No							
Diethylenetriamine pentamethylene phosphonic acid, pentasodium salt solution (47%) (**)	2467	0	NI	0	R	2	NI	NI	NI	NI	NI	NI		D		NI
	3930								CAS No							
Diethyl ethanalamine	622	0	NI	0	NR	3	NI	1	1	2	3	3		D		3
Diethylaminoethanol	241								CAS No		100-37-8					
Diethyl ether	640	0	1	1	NR	0	NI	1	0	0	1	1		DE		2
Diethyl ether	237								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								CAS No		103-23-1					
Di-(2-ethylhexyl) phosphoric acid	643	(2)	1	1	NR	2	NI	0	1	(2)	2	2		Fp		2
Di-(2-ethylhexyl) phosphoric acid	223								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								CAS No		117-81-7					
Diethyl phthalate	648	3	3	3	R	2	0	0	0	(1)	1	1		S		1
Diethyl phthalate	238								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								CAS No		64-67-5					
Diglycidyl ether of Bisphenol A	653	3	NI	3	NR	4	NI	0	0	(2)	1	2	Ss	S		2
Diglycidyl ether of bisphenol A	250								CAS No		1675-54-3					

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Diglycidyl ether of Bisphenol F	728	0	NI	0	NR	3	NI	0	(0)	(2)	1	(2)	SsR		S	3
Diglycidyl ether of bisphenol F	251								CAS No	55492-52-9						
Diheptyl phthalate	655	0	(4)	(4)	R	0	NI	0	0	(1)	1	1			Fp	3
Diheptyl phthalate	252								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								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								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								CAS No							
Diisobutene	575	4	4	4	NR	3	NI	0	0	0	1	0			FE	2
Diisobutylene	257								CAS No	11071-47-9						
Diisobutylamine	576	(2)	NI	(2)	(R)	(3)	NI	2	(2)	2	(3)	(3)			FED	3
Diisobutylamine	256								CAS No	110-96-3						
Diisobutyl ketone	579	3	NI	3	R	2	NI	0	0	2	2	2			F	2
Diisobutyl ketone	254								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								CAS No	84-69-5						
Diisodecyl phthalate	619	0	0	0	(R)	0	(0)	0	0	(1)	0	1			Fp	2
Diisodecyl phthalate	3119								CAS No	26761-40-0						
Diisoheptyl phthalate	2391	0	(4)	(4)	R	0	0	0	0	(1)	1	1	R		Fp	3
Diisoheptyl phthalate	3561								CAS No							
Diisononyl adipate	690	0	NI	0	R	0	0	0	0	(1)	1	1			Fp	2
Diisononyl adipate	258								CAS No	33703-08-1						
Diisononyl phthalate	691	0	0	0	R	0	0	0	0	(0)	0	0			Fp	2
Diisononyl phthalate	3120								CAS No							
Diisoocetyl phthalate	693	0	4	4	(R)	0	0	0	0	(1)	1	0			Fp	2
Diisoocetyl phthalate	259								CAS No	27554-26-3						
Diisopropanolamine	703	0	NI	0	NR	1	NI	0	0	0	2	3			FD	3
Diisopropanolamine	260								CAS No	110-97-4						

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Diisopropylamine	705	1	NI	1	NR	2	0	1	1	2	3	3				ED	3
Diisopropylamine	261								CAS No	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								CAS No								
1,3-Diisopropylbenzene	706	5	4	4	NR	4	NI	0	0	2	2	1				F	2
1,3-Diisopropyl benzene	2626								CAS No	25321-09-9							
Diisopropyl ether	711	1	NI	1	NR	2	NI	0	0	0	1	2				E	2
Isopropyl ether	406								CAS No	108-20-3							
Diisopropyl naphthalene, mixed isomers	712	5	4	4	NR	3	NI	0	0	(1)	1	1				Fp	2
Diisopropyl naphthalene	263								CAS No	38640-62-9							
Dimethoxymethane	2405								CAS No								
Methylal (>=85%)	3662								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								CAS No	127-19-5							
Dimethyl acetamide	658	0	NI	0	R	1	NI	0	0	2	1	2				D	2
N,N-Dimethylacetamide	2730								CAS No	127-19-5							
Dimethyl adipate	659	1	NI	1	(R)	4	NI	0	0	(0)	1	1				SD	2
Dimethyl adipate	264								CAS No	627-93-0							
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	Ss		NT	DE	3
Dimethylamine solution (greater than 45% but not greater than 55%)	271								CAS No	124-40-3							
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	Ss		NT	DE	3
Dimethylamine solution (greater than 55% but not greater than 65%)	272								CAS No	124-40-3							
Dimethylamine (40-50% aq.sol.)	661	0	NI	0	R	3	0	2	0	2	3B	3	Ss		NT	DE	3
Dimethylamine solution (45% or less)	270								CAS No	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								CAS No	98-94-2							
Dimethyl disulphide	1616	1	NI	1	NR	3	2	2	0	2	1	1				SD	2
Dimethyl disulphide	2504								CAS No	624-92-0							
N,N-Dimethyldodecylamine	2126	3	NI	3	R	4	NI	1	(1)	(3)	3	3				F	3
N,N-Dimethyldodecylamine	468								CAS No	112-18-5							

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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
Diphenylamine, reaction product with 2,4,4-trimethylpentene	1500	NI	1	1	NR	3	NI	0	0	(1)	1	1			Fp	2
Diphenylamine, reaction product with 2,2,4-Trimethylpentene	286								CAS No							
Diphenylamines, alkylated	1770	5	NI	5	NR	(3)	NI	0	0	(1)	(1)	(1)			F	2
Diphenylamines, alkylated	287								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								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								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								CAS No							
Diphenylmethane-4,4'-diisocyanate (#)	700	5	2	2	NR	0	0	0	0	3	2	2	SsSr		S	3
Diphenylmethane diisocyanate	288								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								CAS No							
Di-n-propylamine	704	1	NI	1	NR	3	NI	2	2	2	3C	3			FED	3
Di-n-propylamine	225								CAS No	142-84-7						
Dipropylene glycol	707	0	1	1	R	0	NI	0	0	0	0	1			D	1
Dipropylene glycol	291								CAS No	25265-71-8						
Dipropylene glycol dibenzoate	708	3	NI	3	R	3	NI	0	0	0	0	0			S	0
Dipropylene glycol dibenzoate	2431								CAS No	94-51-9						
Di-n-propyl phthalate	713	3	NI	3	(R)	3	NI	(0)	(0)	(1)	(1)	(1)	R		S	3
Di-n-propyl phthalate	2752								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								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								CAS No							
Ditridecyl adipate	2351	0	NI	0	NR	0	NI	0	0	(2)	2	1			Fp	2
Ditridecyl adipate	293								CAS No							
Ditridecyl phthalate	714	0	(0)	0	NR	0	(0)	0	0	(1)	1	(1)			Fp	2
Ditridecyl phthalate	2994								CAS No	119-06-2						

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Ethyl amyl ketone	1784	2	NI	2	NI	2	NI	0	0	(2)	2	NI			FD	2
Ethyl amyl ketone	316								CAS No	106-68-3						
Ethylbenzene	740	3	2	2	R	3	(1)	0	0	0	2	2	C		FE	3
Ethylbenzene	324								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								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								CAS No	637-92-3						
Ethyl butyrate	748	1	NI	1	NI	2	NI	0	0	(2)	2	NI			FED	2
Ethyl butyrate	317								CAS No	105-54-4						
Ethyl cyclohexane	751	4	4	4	NR	3	NI	(0)	(0)	(1)	(1)	(1)			FE	2
Ethylcyclohexane	325								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								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								CAS No	759-94-4						
Ethylene carbonate	755	0	NI	0	R	0	NI	0	0	(2)	1	2			SD	2
Ethylene carbonate	326								CAS No	96-49-1						
Ethylene chlorohydrin	756	0	0	0	R	3	NI	2	3	4	2	3			D	3
Ethylene chlorohydrin	327								CAS No	107-07-3						
Ethylene cyanohydrin	757	0	0	0	NI	2	NI	1	0	(2)	1	2			D	2
Ethylene cyanohydrin	328								CAS No	109-78-4						
Ethylene diamine	758	0	1	1	R	3	1	1	2	1	3	3	SsSr		D	3
Ethylenediamine	343								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
Ethylenediaminetetraacetic acid, tetrasodium salt solution	344								CAS No	64-02-8						
Ethylene dibromide	760	1	2	2	NR	3	NI	2	2	2	3	3	CRT		SD	3
Ethylene dibromide	329								CAS No	106-93-4						
Ethylene glycol	761	0	NI	0	R	0	NI	1	(1)	(1)	0	0			D	1
Ethylene glycol	331								CAS No	107-21-1						

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Ethylene glycol acrylate	869	0	NI	0	R	4	NI	1	3	3	3	3	MSs			D	3
2-Hydroxyethyl acrylate	51								CAS No		818-61-1						
Ethylene glycol butyl ether acetate (#)	764	1	NI	1	R	2	NI	1	1	(1)	1	1				FD	1
Ethylene glycol butyl ether acetate	334								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								CAS No		111-55-7						
Ethylene glycol ethyl ether acetate	767	0	NI	0	R	2	0	1	0	1	1	1	R			D	3
2-Ethoxyethyl acetate	41								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								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								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								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								CAS No								
Ethylene glycol monoethyl ether	766	0	NI	0	R	0	0	0	0	1	2	2				D	3
2-Ethoxyethanol	40								CAS No		110-80-5						
Ethylene glycol phenyl ether	775	1	NI	1	R	1	0	1	0	0	1	2				SD	2
Ethylene glycol phenyl ether	339								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								CAS No								
Ethylene oxide	77	NI	NI	NI	NI	NI	NI	NI	1	(1)	3	3	CMR			GD	3
Ethylene oxide	2744								CAS No		75-21-8						
Ethylene-propylene copolymer	1508	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)				NI	0
Propylene-Butylene copolymer	633								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								CAS No								
Ethyl 3-ethoxypropionate	1439	1	NI	1	NR	2	NI	0	0	0	1	1				FD	1
Ethyl-3-ethoxypropionate	321								CAS No		763-69-9						

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Formamide	808	0	NI	0	NR	1	NI	0	0	1	1	2	R			3
Formamide	355								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								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								CAS No							
Fumaric adduct of rosin (water dispersion)	810	3	NI	3	NR	3	NI	0	(0)	(3)	0	3	Ss			D 3
Fumaric adduct of rosin, water dispersion	357								CAS No	65997-04-8						
Furfural	812	0	NI	0	R	2	1	2	(2)	3	2	2	C			D 3
Furfural	358								CAS No	98-01-1						
Furfuryl alcohol	813	0	NI	0	R	1	NI	2	2	3	2	2				D 2
Furfuryl alcohol	359								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)	(1)				D 2
Glucitol/glycerol blend propoxylated (containing 10% or more amines)	3919								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								CAS No							
Glycerine	814	0	NI	0	R	0	0	0	0	(1)	0	1				D 1
Glycerine	363								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								CAS No							
Glycerol ethoxylated	2360	0	NI	0	R	0	NI	0	0	(0)	0	0				D 0
Glycerol ethoxylated	3123								CAS No							
Glycerol monooleate	1898	0	0	0	R	0	NI	0	(0)	(1)	1	1				Fp 2
Glycerol monooleate	365								CAS No	25496-72-4						
Glycerol propoxylated	2346	0	NI	0	NR	1	NI	1	0	(2)	1	0				D 2
Glycerol propoxylated	3110								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								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								CAS No							

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1-Heptene	832	3	NI	3	NI	2	NI	(0)	(0)	(0)	(2)	(1)				E	2
1-Heptene	2685								CAS No								
Heptyl acetate	833	3	NI	3	(R)	(3)	NI	0	0	(2)	1	2				F	2
Heptyl acetate	375								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								CAS No								
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	R			D	3
Hexamethylenediamine solution	380								CAS No	124-09-4							
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	R			D	3
Hexamethylenediamine (molten)	378								CAS No	124-09-4							
Hexamethylene diamine	845	0	NI	0	R	2	NI	1	1	(3)	3A	3	R			D	3
Hexamethylenediamine	377								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								CAS No	3323-53-3							
Hexamethylene diisocyanate	2142	3	0	0	NR	2	NI	1	2	4	3	3	SsSr			S	3
Hexamethylene diisocyanate	18								CAS No	822-06-0							
Hexamethylene glycol	847	0	NI	0	R	1	NI	0	0	(1)	0	1				D	1
Hexamethylene glycol	376								CAS No	629-11-8							
Hexamethylenimine	848	1	NI	1	NI	2	NI	3	1	2	2	2				FED	2
Hexamethylenimine	381								CAS No	111-49-9							
Hexamethylene tetramine (40% solution)	849	0	NI	0	R	0	NI	0	0	(1)	0	1	Ss			D	2
Hexamethylenetetramine solutions	382								CAS No	100-97-0							
Hexane	850	3	NI	3	R	4	NI	0	0	0	2	2	NA			E	2
Hexane	2683								CAS No	100-54-3							
Hexane (all isomers)	850	3	NI	3	R	4	NI	0	0	0	2	2	NA			E	2
Hexane (all isomers)	383								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								CAS No								
Hexanoic acid	853	2	NI	2	R	2	NI	0	0	(3)	(3)	3				FD	3
Hexanoic acid	384								CAS No	142-62-1							

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1-Hexanol	854	1	0	0	(R)	2	NI	1	0	(3)	1	3				FD 3
Hexanol	385								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								CAS No							
1-Hexene	855	3	NI	3	R	3	NI	0	0	0	1	1				E 2
1-Hexene	2681								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								CAS No							
Hexyl acetate	857	2	NI	2	NI	3	NI	0	0	(1)	1	1				FE 2
Hexyl acetate	387								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								CAS No		108-84-9					
Hexylene glycol	859	0	NI	0	R	0	0	0	0	(3)	2	3				D 2
Hexylene glycol	388								CAS No		107-41-5					
Hydrocarbon waxes	2278	0	NI	0	NR	0	0	0	0	(0)	1	1				Fp 2
Hydrocarbon waxes	2886								CAS No							
Hydrochloric acid	864	Inorg	0	0	Inorg	1	NI	1	1	3	3C	3				DE 3
Hydrochloric acid	389								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								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								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								CAS No		7722-84-1					
Hydrogen peroxide, more than 8%	2231	Inorg	0	0	Inorg	3	NI	1	0	(2)	3	3				D 3
Hydrogen peroxide, more than 8%	2690								CAS No							
Hydrogen peroxide, more than 8%	2231	Inorg	0	0	Inorg	3	NI	1	0	(2)	3	3				D 3
Hydrogen peroxide solutions (over 8% but not over 60% by mass)	391								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 3
N-(Hydroxyethyl)ethylenediaminetriacetic acid, trisodium salt solution	470								CAS No		150-30-0					

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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								CAS No	583-91-5							
Icosa(oxypropane-2,3-diy)ls	2092	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)				Fp	2
Icosa(oxypropane-2,3-diy)ls	392								CAS No								
Icosa(oxypropane-2,3-diy)ls	2092	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)				Fp	2
Icosa(oxypropane-2,3-diy)ls	2691								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								CAS No								
Interesterified Mixed Vegetable Oils	2355	0	NI	0	R	(0)	NI	(0)	(0)	(1)	(1)	(1)				Fp	2
Interesterified vegetable oils	3115								CAS No								
Isobutanol	382	0	NI	0	R	1	0	0	0	1	2	3				D	3
Isobutyl alcohol	397								CAS No	78-83-1							
Isobutyl formate	405	1	NI	1	NI	1	NI	0	(0)	0	(1)	(2)				E	2
Isobutyl formate	398								CAS No	542-55-2							
Isobutyl methacrylate	408	2	NI	2	NR	1	NI	0	0	0	2	2		Ss		FED	2
Isobutyl methacrylate	2673								CAS No	97-86-9							
Isobutyric acid	419	0	NI	0	R	2	NI	2	2	(3)	3	3				E	NI
Isobutyric acid	2459								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								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								CAS No	2430-22-0							
Isononylaldehyde	2300	3	NI	3	NR	(3)	NI	0	0	(2)	2	1				F	2
Isononylaldehyde	2754								CAS No								
Isooctaldehyde	1071	2	NI	2	NI	3	NI	0	0	(1)	1	1				F	1
Octyl aldehydes	542								CAS No	63885-09-6							
Isooctanol	1076	3	NI	3	R	2	0	1	0	(2)	2	(2)				F	2
iso-Octanol	2675								CAS No	26952-21-6							
Isooctylamine	1081	2	NI	2	NI	3	NI	1	1	3	3	3				FD	3
2-Ethylhexylamine	48								CAS No	104-75-6							

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Isopentene	1113	2	2	NI	2	NI	2	NI	(0)	(0)	(0)	(1)				E	2
iso-Pentene	2677								CAS No	563-45-1							
Isophorone	879	1	1	1	R	2	0	1	1	(2)	1	2				FD	2
Isophorone	399								CAS No	78-59-1							
Isophorone diamine	880	0	0	0	NR	2	0	1	(1)	(3)	3	3	Ss			D	3
Isophoronediamine	401								CAS No	2855-13-2							
Isophorone diisocyanate	881	1	NI	1	NR	3	NI	0	0	3	3	3	SsSrA			S	3
Isophorone diisocyanate	400								CAS No	4098-71-9							
Isoprene	882	2	2	2	NR	3	1	0	0	0	1	2	CM			E	3
Isoprene	402								CAS No	78-79-5							
Isopropanol	1181	0	NI	0	R	0	0	0	0	0	1	2				D	2
Isopropyl alcohol	405								CAS No	67-63-0							
Isopropanolamine	1182	0	NI	0	R	2	NI	0	1	0	3	3				D	3
Isopropanolamine	403								CAS No	78-96-6							
Isopropyl acetate	1192	1	NI	1	R	1	NI	0	0	0	1	2				ED	2
Isopropyl acetate	404								CAS No	108-21-4							
Isopropylamine	1195	0	NI	0	R	2	NI	2	2	1	3	3				DE	3
Isopropylamine	407								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								CAS No								
Isopropyl benzene	1197	3	2	2	R	3	NI	0	0	0	2	1				FE	2
Isopropylbenzene	2687								CAS No	98-82-8							
Isopropyl benzene	1197	3	2	2	R	3	NI	0	0	0	2	1				FE	2
Propylbenzene (all isomers)	623								CAS No	98-82-8							
Isopropyl cyclohexane	1199	4	NI	4	(NR)	(3)	NI	(0)	(0)	(1)	(0)	(1)				FE	2
Isopropylcyclohexane	408								CAS No	696-29-7							
Isopropyltoluenes	549	4	4	4	(NR)	3	NI	0	(0)	1	2	(1)				FE	2
p-Cymene	552								CAS No	99-87-6							
Isovaleraldehyde	1390	1	NI	1	R	3	NI	0	0	0	2	2				D	2
Valeraldehyde (all isomers)	731								CAS No	590-86-3							

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Jatropha oil	2402	0	NI	(0)	(R)	(2)	NI	(0)	(0)	(0)	(0)	(0)				Fp	2			
Jatropha oil	3637								CAS No											
Kaolin slurry	883	Inorg	NI	0	Inorg	0	NI	0	0	0	0	0	0			S	0			
Kaolin slurry	409								CAS No								1332-58-7			
Lactic acid	886	0	NI	0	R	1	NI	0	0	(3)	2	3				D	3			
Lactic acid	410								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								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								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								CAS No											
Lauric acid	891	4	NI	4	R	4	1	0	(0)	(2)	1	2				Fp	2			
Lauric acid	415								CAS No								143-07-7			
Lauryl methacrylate	893	0	2	2	R	0	0	0	(0)	(1)	1	1				F	1			
Dodecyl methacrylate	300								CAS No								142-90-5			
Lecithin (soybeans)	2146	0	NI	0	R	0	NI	0	0	(0)	0	(0)				SD	0			
Lecithin	417								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								CAS No											
Linear alkyl (C12-16) propoxylamine ethoxylate	2380	3	0	3	NR	4	NI	1	(1)	(3)	3	(3)				D	3			
Alkyl(C12-C16) propoxylamine ethoxylate	3423								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								CAS No											
Long chain alkaryl polyether (C11-C20) (LOA)	1982	(4)	NI	(4)	NR	3	(1)	0	0	(2)	0	2				Fp	2			
Long-chain alkaryl polyether (C11-C20)	421								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								CAS No											
Long-chain alkylphenate/Phenol sulphide mixture	1754	(0)	NI	(0)	(NR)	0	NI	0	0	(2)	2	2				Fp	2			
Long-chain alkylphenate/Phenol sulphide mixture	425								CAS No											

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Long-chain polyetheramine in alkyl(C2-C4)benzenes	1457	NI	NI	NI	NR	2	NI	0	0	(2)	2	2				Fp	2
	422																
Lubrizol polyolefin anhydride	1865	0	NI	0	NR	1	NI	0	0	(2)	1	(2)				Fp	2
Polyolefin anhydride	605																
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																
Magnesium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	71	(0)	NI	(0)	NR	(2)	NI	0	0	(1)	(1)	(1)	Ss			S	2
Magnesium long-chain alkyl salicylate (C11+)	429																
Magnesium chloride	915	Inorg	0	0	Inorg	1	0	0	0	(0)	0	0				D	0
Magnesium chloride solution	427											7786-30-3					
Magnesium hydroxide slurry	916	Inorg	0	0	Inorg	0	NI	0	0	(1)	(0)	1				S	1
Magnesium hydroxide slurry	428											1309-42-8					
Magnesium lignosulphonate solutions	2356	(0)	NI	(0)	(NR)	(0)	NI	0	0	(0)	(0)	(0)				D	0
Lignosulphonic acid, magnesium salt solution	3116																
Magnesium long chain alkaryl sulphionate (C11-C50) (LOA)	1967	0	NI	0	NR	0	NI	0	0	(2)	1	2				Fp	2
Magnesium long-chain alkaryl sulphionate (C11-C50)	430																
Maleic acid/allyl sulphonic 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 sulphonic acid copolymer with phosphonate groups, partial sodium salt (aqueous solution)	3688																
Maleic anhydride	921	1	NI	1	R	2	0	1	2	(3)	3	3	SsSr			D	3
Maleic anhydride	431											108-31-6					
Maleic anhydride - sodium allylsulphonate copolymer (aqueous solution)	2410	0	NI	0	NR	1	NI	0	0	(0)	(0)	0				D	0
Maleic anhydride-sodium allylsulphonate copolymer solution	3686																
Maltitol Syrup	2348	0	NI	0	R	0	NI	0	0	(0)	0	0				D	0
Maltitol solution	3078																
Mango kernel 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																
2-Mercaptobenzothiazol	925	2	1	1	NR	4	2	0	0	(0)	0	0	Ss			S	2
Mercaptobenzothiazol, sodium salt solution	432											149-30-4					

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Mesityl oxide	946	1	NI	1	R	(1)	NI	1	0	2	2	2				D	2
Mesityl oxide	433								CAS No		141-79-7						
Metam-sodium (ISO)	202	0	NI	0	NR	4	NI	1	2	(2)	2	1	Ss			D	2
Metam sodium solution	434								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								CAS No								
Methacrylic acid, inhibited	948	0	NI	0	R	2	0	1	2	2	3	3				D	3
Methacrylic acid	435								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								CAS No								
Methacrylonitrile	949	0	NI	0	R	2	0	2	2	3	1	1	Ss	NT	ED		3
Methacrylonitrile	437								CAS No		126-98-7						
Methanol	951	0	NI	0	R	0	0	(2)	(2)	(2)	2	2	T			DE	3
Methyl alcohol	441								CAS No		67-56-1						
(2-Methoxymethylethoxy)propanols	2452	0	NI	0	R	0	(0)	0	0	(0)	0	0				D	0
	3870								CAS No								
Methyl acetate	954	0	NI	0	R	1	NI	0	0	0	1	2				DE	2
Methyl acetate	438								CAS No		79-20-9						
Methyl acetoacetate	335	0	NI	0	R	1	NI	0	0	(2)	1	2				D	2
Methyl acetoacetate	439								CAS No		105-45-3						
Methyl acrylate	955	0	NI	0	R	3	NI	1	1	2	2	3	MSs			D	3
Methyl acrylate	440								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								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								CAS No		108-11-2						
Methyl amyl ketone	959	1	NI	1	NI	1	NI	1	0	0	1	1				FED	2
Methyl amyl ketone	442								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								CAS No		100-61-8						

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		NI	1	NI	1	(R)	(1)	NI	(1)	(0)	(3)	(2)	(3)	R		Fp	3
										CAS No							
alpha-Methylbenzyl alcohol with acetophenone (15% or less)	2399	1	1	NI	1	(R)	(1)	NI	(1)	(0)	(3)	(2)	(3)				
alpha-Methylbenzyl alcohol with acetophenone (15% or less)	3634									CAS No	98-85-1						
2-Methyl-2-butanol	964	1	1	1	1	(R)	(1)	0	1	1	1	3	2			D	3
tert-Amyl alcohol	685									CAS No	75-85-4						
3-Methyl-1-butanol	965	1	1	1	1	(R)	1	0	1	0	(2)	2	2			FED	2
Isoamyl alcohol	396									CAS No	123-51-3						
3-Methyl-1-butanol	965	1	1	1	1	(R)	1	0	1	0	(2)	2	2			FED	2
Amyl alcohol, primary	126									CAS No	123-51-3						
Methyl butenol	967	0	NI	0	R	2	NI	1	0	(2)	2	2	2			D	2
Methylbutenol	458									CAS No	556-82-1						
Methyl tert-butyl ether	969	1	NI	1	NR	1	0	0	0	0	2	1	1		T	ED	2
Methyl tert-butyl ether	454									CAS No	1634-04-4						
Methyl butyl ketone	970	1	NI	1	(R)	1	(0)	0	0	0	1	1	1	RN		FED	3
Methyl butyl ketone	443									CAS No	591-78-6						
Methylbutynol	968	0	NI	0	NR	1	NI	1	1	0	0	2	2			D	2
Methylbutynol	459									CAS No	115-19-5						
Methylbutynol	968	0	NI	0	NR	1	NI	1	1	0	0	2	2			D	2
2-Methyl-2-hydroxy-3-butyne	52									CAS No	115-19-5						
Methyl butyrate	973	1	NI	1	NI	(2)	NI	0	0	2	2	(2)	(2)			ED	2
Methyl butyrate	444									CAS No	623-42-7						
Methyl cyclohexane	976	3	3	3	NR	3	1	0	0	1	1	1	1	A		E	2
Methylcyclohexane	460									CAS No	108-87-2						
Methyl cyclopentadiene, dimer	977	4	NI	4	(NR)	(3)	NI	0	(0)	(2)	(2)	(2)	(2)			F	2
Methylcyclopentadiene dimer	461									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	1			S	3
Methylcyclopentadienyl manganese tricarbonyl	2692									CAS No							
N-Methyldiethanolamine	1491	0	NI	0	R	2	NI	1	0	(2)	1	2	2			D	2
Methyl diethanolamine	445									CAS No	105-59-9						
Methylene dithiocyanate	2235	2	NI	2	NR	5	NI	2	0	4	3	3	3	Ss		NI	3
Methylene bithiocyanate	2693									CAS No	6317-18-6						

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2-Methyl-6-ethylaniline	984	2	NI	2	NR	2	NI	1	1	(2)	0	2				FD	2	
2-Methyl-6-ethyl aniline	54								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								CAS No	104-90-5								
Methyl formate	987	0	NI	0	R	1	NI	1	0	2	0	2				DE	2	
Methyl formate	447								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								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								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								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								CAS No	108-10-1								
Methyl methacrylate	995	1	NI	1	R	2	NI	0	0	0	2	2				ED	2	
Methyl methacrylate	450								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								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								CAS No									
Methyl naphthalenes	1999	4	NI	4	(NR)	(4)	NI	1	0	(2)	1	1				T	F	2
Methyl naphthalene (molten)	451								CAS No									
2-Methyl pentane	1000	3	NI	3	NI	4	NI	(0)	(0)	(2)	(2)	(2)				E	2	
2-Methylpentane	2684								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								CAS No									
Methyl propyl ketone	1003	0	NI	0	(R)	0	NI	1	0	(2)	1	2				FED	2	
Methyl propyl ketone	452								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								CAS No	109-06-8								

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3-Methylpyridine	1006	1	NI	1	R	1	NI	1	2	2	3	3				D	3
3-Methylpyridine	61								CAS No	108-99-6							
4-Methylpyridine	1007	1	NI	1	(R)	1	NI	1	2	2	3	3				D	3
4-Methylpyridine	63								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								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								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								CAS No	98-83-9							
3-(Methylthio) propionaldehyde	993	0	NI	0	R	3	1	1	1	2	2	3	NSs	T	D		3
3-(methylthio)propionaldehyde	2368								CAS No	3268-49-3							
Metolachlor (ISO)	113	2	2	2	NR	5	1	1	0	(2)	1	0	Ss	S			2
N-(2-Methoxy-1-methyl ethyl)-2-ethyl-6-methyl chloroacetamide	469								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 soyabean, corn (maize) and sunflower oil refining	3036								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								CAS No								
Molasses	1013	0	NI	0	R	0	NI	0	0	0	0	0		D			0
Molasses	462								CAS No								
Molybdenum polysulphide long chain alkyl dithiocarbamide complex	2344	4	2	2	NR	2	0	0	0	(2)	2	2		Fp			2
Molybdenum polysulphide long chain alkyl dithiocarbamide complex	3108								CAS No								
Mononitrobenzene	1017	1	1	1	R	3	(4)	(2)	2	2	1	1	CRT	SD			3
Nitrobenzene	501								CAS No	98-95-3							
Morpholine	1018	0	0	0	R	2	NI	1	2	2	3	3		D			3
Morpholine	463								CAS No	110-91-8							
Myrcene	1019	4	NI	4	R	4	1	0	0	(2)	2	NI		F			2
Myrcene	465								CAS No	123-35-3							
Naphthalene (molten)	1	3	3	3	NR	4	1	1	(0)	(1)	0	0	T	T	S		2
Naphthalene (molten)	493								CAS No	91-20-3							

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Naphthalene, crude (molten) (#)(!)	2459	NI	(3)	(3)	NR	3	0	0	(0)	(2)	2	2	CMT		Fp	3
Naphthalene crude (molten)	3858								CAS No	85117-10-8						
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								CAS No	9084-06-4						
Neodecanoic acid	1025	4	NI	4	NR	2	NI	0	0	(2)	0	2			Fp	2
Neodecanoic acid	496								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 (70% and over)	498								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 (less than 70%)	499								CAS No	7697-37-2						
Nitriiotriacetic acid, trisodium salt	1030	0	NI	0	R	1	0	1	(0)	0	1	1	CMR		D	3
Nitriiotriacetic acid, trisodium salt solution	500								CAS No	5094-31-3						
Nitroethane	1037	0	NI	0	NR	2	NI	1	0	(2)	(0)	(1)			SD	2
Nitroethane	502								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								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								CAS No							
2-Nitrophenol	1041	1	2	2	R	3	(2)	0	0	(1)	1	1			S	1
o-Nitrophenol (molten)	536								CAS No	88-75-5						
1-Nitropropane	1044	0	1	1	NR	1	NI	1	0	2	0	1			FED	2
1-Nitropropane	2747								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								CAS No							
2-Nitropropane	1045	0	1	1	NR	2	NI	2	0	2	0	0	C		FED	3
2-Nitropropane	2748								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								CAS No							
o-Nitrotoluene	1049	2	2	2	NR	2	(1)	1	0	(2)	0	1	CMR		S	3
o-Nitrotoluene	2745								CAS No	88-72-2						

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p-Nitrotoluene	1051	2	1	1	NR	3	0	1	0	(2)	0	1	R		S	3
p-Nitrotoluene	2746								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								CAS No							
Nonane	1054	4	NI	4	R	4	NI	0	0	1	1	1	A		FE	2
Nonane (all isomers)	506								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								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								CAS No							
1-Nonene	1060	4	NI	4	NI	3	NI	0	0	0	1	1	A		FE	2
1-Nonene	2680								CAS No	27215-95-8						
Nonyl acetate	1766	4	NI	4	NI	NI	NI	0	0	NI	NI	NI			F	NI
Nonyl acetate	509								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								CAS No	2696-43-7						
Nonyl phenol	1062	5	4	4	NR	5	3	1	0	(3)	3	3			Fp	3
Nonyl phenol	512								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
Alkyl(C7-C11)phenol poly(4-12) ethoxylate	97								CAS No							
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								CAS No							
Octamethylcyclotetrasiloxane	2398	5	5	5	NR	0	3	0	0	0	0	0			F	1
Octamethylcyclotetrasiloxane	3633								CAS No							
Octane	1072	5	NI	5	(R)	4	NI	(0)	(0)	0	0	0	A		FE	2
Octane (all isomers)	538								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								CAS No	134-07-2						
1-Octanol	1075	3	NI	3	R	2	0	1	0	(2)	2	2			Fp	2
Octanol (all isomers)	540								CAS No	111-87-5						

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1-Pentene	1114	2	NI	2	NI	(2)	NI	(0)	(0)	0	(0)	(1)				E	2		
1-Pentene	2679								CAS No	109-67-1									
2-Pentene	1115	2	NI	2	NI	2	NI	(0)	(0)	(0)	(0)	(1)				E	2		
2-Pentene	2678								CAS No	109-68-2									
Petrolatum	2244	0	NI	0	NR	0	NI	0	0	2	1	1				Fp	2		
Petrolatum	565								CAS No										
Petroleum wax	1122	0	NI	0	NR	0	NI	0	0	(0)	0	0				Fp	2		
Waxes	741								CAS No	8002-74-2									
Phenol	1124	1	2	2	R	3	0	2	2	(3)	3	3				NT	S	3	
Phenol	566								CAS No	108-95-2									
Phenylylethane	1135	5	4	4	NR	(2)	NI	1	0	(1)	(0)	0				F	1		
1-Phenyl-1-xylyl ethane	23								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								CAS No										
Phosphoric acid	1138	0	NI	0	Inorg	1	NI	(3)	(3)	3	3	3				D	3		
Phosphoric acid	567								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								CAS No	7732-14-0									
Phthalic anhydride (molten)	1146	1	NI	1	R	2	0	1	0	(3)	1	3				SsSr	S	3	
Phthalic anhydride (molten)	569								CAS No	85-44-9									
alpha-Pinene	40	4	NI	4	R	4	NI	0	0	0	1	(1)				Ss	T	F	3
alpha-Pinene	109								CAS No	80-56-8									
beta-Pinene	41	4	NI	4	(R)	4	NI	0	0	0	1	(1)				Ss	NT	F	3
beta-Pinene	141								CAS No	1330-16-1									
Pine oil	1148	4	NI	4	NR	4	NI	0	0	(1)	(1)	(1)				Ss	(T)	Fp	3
Pine oil	570								CAS No	8002-09-3									
Piperazine, 68% Aqueous	2433	0	NI	0	NR	2	NI	0	0	2	3A	3				SsSrN	SD	S	3
Piperazine, 68% solution	3748								CAS No	110-85-0									

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Poly(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
Brake fluid base mix: Poly(2-8)alkylene (C2-C3) glycols/Polyalkylene (C2-C10) glycols monoalkyl (C1-C4) ethers and their borate esters	144								CAS No							
Polyacrylic acid (40% solution)	2302	(2)	NI	(2)	NR	1	NI	0	0	(1)	1	1				D
Polyacrylic acid solution (40% or less)	2709								CAS No							
Poly(C18-C22)alkyl acrylate in xylene	1151	(3)	NI	(3)	NR	2	NI	0	0	(2)	2	1				Fp
Polyalkyl (C18-C22) acrylate in xylene	580								CAS No							
Polyalkylalkenaminesuccinimide, molybdenum oxysulphide	2379	NI	0	0	NR	0	NI	0	0	(0)	0	0				Fp
Polyalkylalkenaminesuccinimide, molybdenum oxysulphide	3422								CAS No							
Poly(2-8)alkylene glycol monoalkyl(C1-C6) ether	1152	1	NI	1	R	1	0	0	0	0	2	2				D
Poly(2-8)alkylene glycol monoalkyl(C1-C6) ether	576								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
Poly(2-8)alkylene glycol monoalkyl (C1-C6) ether acetate	575								CAS No							
Poly N-alkylmethacrylamide ammonium acrylate copolymer (20 % in DEGME) (**)	2468	0	NI	0	NR	2	NI	NI	NI	NI	NI	NI				D
	3931								CAS No							
Poly alkyl methacrylate (C1-C20) (LOA)	1984	(5)	NI	(5)	NR	0	NI	0	0	0	0	0				Fp
Polyalkyl (C10-C20) methacrylate	2189								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
Polyalkyl (C10-C18) methacrylate/ethylene-propylene copolymer mixture	2188								CAS No							
Polyaluminium chloride (sol.)	1136	Inorg	0	0	Inorg	0	NI	(0)	(0)	(1)	(0)	(1)				D
Polyaluminium chloride solution	584								CAS No							
Polybutene	1154	0	NI	0	(NR)	(0)	(0)	(0)	(0)	(0)	(0)	(0)				Fp
Polybutene	585								CAS No							
Polybutenylsuccinimide in oil	2055	5	NI	5	NR	0	NI	(0)	(0)	(0)	0	(0)				Fp
Polybutenyl succinimide	586								CAS No							
Poly(2+)cyclic aromatics	2246	4	4	4	NR	(4)	NI	(1)	(1)	(2)	(1)	(1)	CM			S
Poly(2+)cyclic aromatics	574								CAS No							
Polyether, borated	1863	0	NI	0	NR	3	1	0	(0)	(1)	1	0				D
Polyether, borated	572								CAS No							

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Polyether (molecular weight 2000+) (LOA)	1975	0	NI	0	NR	1	NI	0	(0)	(0)	0	0				Fp	2			
Polyether (molecular weight 1350+)	587								CAS No											
Polyethylene amines / paraffin mixtures	1991	(5)	NI	(5)	NR	3	0	0	(1)	(3)	(2)	(3)		Ss			Fp	3		
Polyethylene polyamines (more than 50% C5 -C20 paraffin oil)	591								CAS No											
Polyethylene glycol	1157	0	NI	0	NR	0	NI	0	0	0	1	1					D	1		
Polyethylene glycol	589								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								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								CAS No											
Polyethylene polyamines	2367	0	NI	0	NR	3	0	1	0	(3)	2	(3)		Ss			D	0		
Polyethylene polyamines	3131								CAS No											
Polyferric sulphate solution	338	Inorg	0	0	Inorg	(2)	NI	1	(1)	(3)	3	(3)					D	3		
Polyferric sulphate solution	592								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								CAS No											
Polyglycerol	1511	NI	NI	NI	NI	NI	NI	0	(0)	(0)	(0)	(0)					D	0		
Polyglycerol	594								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								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								CAS No											
(Polyisobutene)amino products in aliphatic hydrocarbons	2455	0	NI	(5)	NR	2	NI	0	0	(1)	1	0		A			Fp	3		
(Polyisobutene) amino products in aliphatic hydrocarbons	3811								CAS No											
Polyisobutenyl anhydride adduct	2127	0	NI	0	NR	0	NI	0	0	(1)	0	1					FD	1		
Polyisobutenyl anhydride adduct	2256								CAS No											
Poly(4+)isobutylene	2264	0	NI	0	NR	0	NI	(0)	(0)	(0)	(0)	(0)					Fp	2		
Polyisobutylene (MW≤224)	578								CAS No											
Polymethylene polyphenyl isocyanate	1153	NI	(2)	(2)	NR	0	0	0	0	(2)	2	2		SsSr			S	2		
Polymethylene polyphenyl isocyanate	595								CAS No								9016-87-9			

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Polyolefin acid, potassium salt	1895	NI	NI	NI	NR	0	NI	0	0	(0)	0	0			NI	0			
Potassium salt of polyolefin acid	2199								CAS No										
Polyolefinamide alkene(C16+) amine (LOA)	2104	5	NI	5	NR	0	NI	0	0	(1)	1	(1)			Fp	2			
Polyolefin amide alkeneamine (C17+)	597								CAS No										
Polyolefin amide alkeneamine (C28+)	1971	0	NI	0	NR	0	NI	0	0	(0)	1	(1)			NI	1			
Polyolefin amide alkeneamine (C28+)	598								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								CAS No										
Polyolefin amide alkeneamine/molybden oxysulphide mi	2256	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI			NI	NI			
Polyolefin amide alkeneamine/molybdenum oxysulphide mixture	603								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								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								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								CAS No										
Polyolefinamine (C28-C250) (LOA)	2107	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)			Fp	2			
Polyolefinamine (C28-C250)	609								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								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								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								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								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								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								CAS No										

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Polyoxyethylene sorbitan monooleate	1442	3	(2)	3	R	2	0	0	(0)	(0)	0	0		D		0
Poly(20)oxyethylene sorbitan monooleate	577								CAS No	9005-65-6						
Polyoxypropylene diamine	2352	1	NI	1	NR	1	NI	0	0	(3)	3	3		D		3
	3112								CAS No							
Polypropylene	1512	0	NI	0	NR	(0)	NI	(0)	(0)	(0)	(0)	(0)		F		1
Poly(5+)propylene	579								CAS No	9003-07-0						
Polypropylene glycol	1159	0	NI	0	(NR)	1	NI	1	0	(1)	1	1		D		1
Polypropylene glycol	612								CAS No	25322-69-4						
Polysiloxane	1161	NI	4	4	NI	2	NI	0	(0)	(0)	0	0		F		1
Dimethylpolysiloxane	275								CAS No							
Polysiloxane	1161	NI	4	4	NI	2	NI	0	(0)	(0)	0	0		F		1
Polysiloxane	613								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								CAS No							
Potassium carbonate solution	2465	Inorg	0	0	Inorg	2	NI	0	0	(0)	2	2		D		2
	3928								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								CAS No							
Potassium chloride solution	1513	0	0	0	Inorg	1	0	0	(0)	(0)	0	0		D		0
Potassium chloride solution	614								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								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								CAS No	1310-58-3						
Potassium oleate	1497	3	NI	3	R	4	NI	(0)	(0)	(1)	1	1		FD		1
Potassium oleate	617								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								CAS No							
Propanol	1180	0	NI	0	R	0	NI	1	0	0	1	2	R	D		3
n-Propyl alcohol	488								CAS No	71-23-8						

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Propanolamine	1183	0	NI	0	R	2	NI	0	1	(3)	3	3				D	3
n-Propanolamine	485								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	(0)			D	0
2-Propene-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer	3696								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
2-Propenoic acid polymer with furandione (65% in 2-butoxyethanol)	3750								CAS No								
beta-Propiolactone	1184	0	NI	0	R	(2)	NI	2	(2)	4	3B	3	CM			D	3
beta-Propiolactone	142								CAS No	57-57-8							
Propionaldehyde	1185	0	NI	0	R	2	NI	1	0	1	2	2				DE	2
Propionaldehyde	619								CAS No	123-38-6							
Propionic acid	1186	0	NI	0	R	2	NI	0	0	(3)	3B	3				D	3
Propionic acid	620								CAS No	79-09-4							
Propionic anhydride	1187	0	NI	0	R	2	NI	0	0	(3)	2	3				FD	3
Propionic anhydride	621								CAS No	123-62-6							
Propionitrile	1188	0	NI	0	NI	0	NI	3	3	4	1	2	R			D	3
Propionitrile	622								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								CAS No	109-60-4							
Propylamine	1194	0	NI	0	NI	1	NI	2	2	3	3	3				DE	3
n-Propylamine	490								CAS No	107-10-8							
Propyl benzene	1196	NI	NI	NI	NI	3	NI	NI	NI	NI	NI	NI		(T)	FE	NI	
Propylbenzene	2686								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								CAS No	540-54-5							
Propylene carbonate	2056	0	NI	0	R	0	NI	0	0	(3)	2	3				D	3
Propylene carbonate	624								CAS No	108-32-7							
Propylene dimer	1201	3	NI	3	R	3	NI	NI	NI	NI	NI	NI				E	2
Propylene dimer	625								CAS No								
1,2-Propylene glycol	1202	0	NI	0	R	0	0	0	0	0	0	0				D	0
Propylene glycol	626								CAS No	57-55-6							

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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								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								CAS No								
Propylene glycol phenyl ether	2057	1	NI	1	NI	1	NI	0	0	(1)	(1)	(1)				SD	1
Propylene glycol phenyl ether	629								CAS No	4169-04-4							
Propylene oxide	76	0	NI	0	R	2	NI	1	2	2	2	3	CM			DE	3
Propylene oxide	630								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								CAS No								
Propylene tetramer	2255	NI	4	4	NR	(4)	NI	(0)	(0)	(1)	(1)	(1)				F	1
Propylene tetramer	631								CAS No	6842-15-5							
Propylene trimer	1207	5	4	4	NR	3	2	(0)	(0)	(1)	(1)	(1)				FE	2
Propylene trimer	632								CAS No	13987-01-4							
Pyridine	1213	0	NI	0	R	3	0	1	1	2	1	3		NT		D	3
Pyridine	634								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								CAS No								
Pyrolysis gasoline	2271	(4)	(3)	(3)	(R)	(3)	(1)	1	0	(2)	2	2	TCM			FE	3
Pyrolysis gasoline (containing benzene)	1990								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								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								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								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								CAS No								
Rosin	1219	3	NI	3	NR	3	NI	0	0	2	(1)	1	Ss			S	2
Rosin	635								CAS No	8050-09-7							

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Rosin soap (disproportionated solution)	1220	3	NI	3	NR	3	NI	0	NI	NI	NI	NI	NI	S	NI	
Rosin soap (disproportionated) solution	636								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								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	
Alkyl (C10-C20, saturated and unsaturated) phosphite	96								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								CAS No							
Silica slurry	1514	Inorg	0	0	Inorg	0	0	(0)	(0)	0	(0)	(0)		S	0	
Microsilica slurry	2507								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								CAS No	127-09-3						
Sodium aluminosilicate slurry	1235	Inorg	0	0	Inorg	1	0	0	0	0	1	1		S	1	
Sodium aluminosilicate slurry	643								CAS No	1344-00-9						
Sodium benzoate	1475	0	NI	0	R	1	NI	0	(0)	(1)	0	1		D	1	
Sodium benzoate	644								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								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								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								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								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		D	2	
Sodium chlorate solution (50% or less)	647								CAS No	7775-09-9						
Sodium dichromate solution	487	Inorg	0	0	Inorg	4	1	2	2	4	2	3	CMSsSr	D	3	
Sodium dichromate solution (70% or less)	649								CAS No	10588-01-9						
Sodium dodecyl sulphate (*)	2451	0	NI	0	R	3	1	NI	NI	NI	NI	NI		NI	NI	
	3869								CAS No							

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Sodium hydrogen sulphide/Ammonium sulphide(mixture)	1253	Inorg	0	0	Inorg	3	NI	1	1	0	2	2				D	2
Sodium hydroxide/Ammonium sulphide solution	653								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
Sodium hydrogen sulphide (6% or less)/Sodium carbonate (3% or less) solution	650								CAS No								
Sodium hydrogen sulphide.solutions	1252	Inorg	0	0	Inorg	1	NI	1	1	1	2	2				D	2
Sodium hydroxide solution (45% or less)	652								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								CAS No	7631-90-5							
Sodium hydroxide solution (#)	1254	Inorg	0	0	Inorg	2	NI	1	1	3	3C	3				D	3
Sodium hydroxide solution	654								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				D	3
Sodium hypochlorite solution (15% or less)	2785								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				D	3
Sodium hypochlorite solution (Full strength solution)	655								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								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								CAS No								
Sodium nitrate	1259	Inorg	0	0	Inorg	0	NI	(0)	(0)	(0)	(1)	(1)				SD	1
Sodium nitrate	656								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								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								CAS No								
Sodium petroleum sulphonate	1860	0	NI	0	(NR)	2	NI	0	(0)	(2)	1	2				S	2
Sodium petroleum sulphonate	660								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								CAS No								
Sodium silicate (solution)	1262	Inorg	0	0	Inorg	2	NI	1	0	(3)	3	3				D	3
Sodium silicate solution	661								CAS No	1344-09-8							

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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	
Sodium sulphate (solution)	1499	Inorg	0	0	Inorg	0	0	0	(0)	(1)	1	1				SD	1
Sodium sulphate solutions	662								CAS No		7757-82-6						
Sodium sulphide (solution)	1263	Inorg	0	0	Inorg	3	NI	1	1	(3)	3A	3				D	3
Sodium sulphide solution (15% or less)	663								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								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								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								CAS No		540-72-7						
Sorbitan monooleate	2215	(5)	NI	(5)	R	3	NI	0	NI	NI	0	0				Fp	2
Sorbitan monooleate	2408								CAS No								
Sorbitol	1265	0	NI	0	R	0	NI	0	(0)	(0)	(0)	(0)				D	0
Sorbitol solution	668								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								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 Acid Methyl Ester	3737								CAS No								
Styrene (monomer)	1273	3	(2)	3	R	3	NI	1	0	2	2	2	CM			FE	3
Styrene monomer	669								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								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								CAS No								
Sulpholane	1277	0	1	1	NR	2	0	1	0	0	1	2				SD	2
Sulpholane	673								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								CAS No								
Sulphur	906	Inorg	0	0	Inorg	0	NI	0	0	(1)	1	1				S	1
Sulphur (molten)	675								CAS No		7704-34-9						

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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		
Tall oil soap, crude	2432	0	NI	0	R	2	0	(0)	(0)	(3)	(3)	(3)	Ss		Fp	3		
Tall oil soap, crude	3735								CAS No									
Tallow	1288	0	NI	0	R	0	NI	0	0	(0)	(0)	(0)	(0)		Fp	2		
Tallow	682								CAS No									
Tallow fatty acid	1289	0	NI	0	R	0	NI	0	(0)	(0)	(0)	(0)	(0)		Fp	2		
Tallow fatty acid	684								CAS No									
1,1,2,2-Tetrachloroethane	53	2	2	2	NR	3	0	2	0	2	2	2	2		SD	2		
Tetrachloroethane	687								CAS No									
1,1,2,2-Tetrachloroethylene	1295	3	2	2	NR	(3)	2	0	0	0	2	1	C		S	3		
Perchloroethylene	564								CAS No									
Tetrachloromethane	1296	2	2	2	NR	3	0	0	0	0	1	1	CT		S	3		
Carbon tetrachloride	178								CAS No									
Tetradecanoic acid (Myristic acid)	1298	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)	(1)		Fp	2		
n-Tetradecanoic acid	491								CAS No									
Tetradecanoic acid (Myristic acid)	1298	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)	(1)		Fp	2		
Fatty acid (saturated C:13+)	347								CAS No									
Tetraethylene glycol	1301	0	NI	0	NR	0	NI	0	0	0	1	1			D	1		
Tetraethylene glycol	688								CAS No									
Tetraethylene pentamine	1302	0	NI	0	NR	3	NI	0	2	(3)	3	3	Ss		D	3		
Tetraethylene pentamine	689								CAS No									
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								CAS No									
Tetrahydrofuran	1304	0	NI	0	R	0	NI	0	(0)	0	1	2			DE	2		
Tetrahydrofuran	690								CAS No									
Tetrahydronaphthalene	1305	3	3	3	NR	3	NI	0	0	(2)	2	0			F	2		
Tetrahydronaphthalene	691								CAS No									
1,2,3,4-Tetramethylbenzene	1307	4	NI	4	NI	4	NI	0	(0)	(1)	1	(1)			F	1		
Tetramethylbenzene (all isomers)	692								CAS No									
Tetrapotassium pyrophosphate	2400	Inorg	0	0	Inorg	1	NI	0	NI	NI	NI	NI	NI		D	NI		
Tetrapotassium pyrophosphate	3635								CAS No									

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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	
Thixatrol plus	2210	5	NI	5	R	3	NI	0	0	0	1	1				S	1
Thixatrol Plus	2699								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								CAS No	CAS No							
Toluene	330	2	2	2	R	3	0	0	0	0	2	2	ANR	NT	E		3
Toluene	693								CAS No	CAS No							
Toluene diisocyanate	1315	(3)	1	1	NR	2	NI	0	(0)	4	3	3	CSsSr		S		3
Toluene diisocyanate	694								CAS No	CAS No							
Toluidines	1316	1	1	1	R	4	2	1	0	(2)	2	2	CM		FD		3
o-Toluidine	537								CAS No								
2,4-Tolylenediamine	1317	0	2	2	NR	3	0	2	2	4	2	3	CMSs		Fp		3
Toluenediamine	695								CAS No	CAS No							
Tolyl triazole	2292	1	NI	1	NR	2	0	1	0	(2)	(1)	2			S		2
Tolyl triazole	696								CAS No								
Tributyl phosphate	1319	4	2	2	R	3	0	1	0	2	2	2			F		2
Tributyl phosphate	697								CAS No	CAS No							
1,2,3-Trichlorobenzene	2191	4	4	4	NR	4	2	1	0	(2)	2	2			S		2
1,2,3-Trichlorobenzene (molten)	2288								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								CAS No	CAS No							
1,1,1-Trichloroethane	1326	2	NI	2	NR	2	NI	0	0	0	2	2			SD		2
1,1,1-Trichloroethane	1								CAS No	CAS No							
1,1,2-Trichloroethane	1327	2	1	1	NR	2	0	1	0	1	2	1			SD		2
1,1,2-Trichloroethane	3								CAS No	CAS No							
1,1,2-Trichloro-ethylene	329	2	2	2	NR	3	NI	0	0	0	2	2	MC		SD		3
Trichloroethylene	698								CAS No	CAS No							
Trichloromethane	1328	1	1	1	NR	2	0	2	0	2	1	1	CT		SD		3
Chloroform	186								CAS No	CAS No							
1,2,3-Trichloropropane	1329	2	2	2	NR	2	0	2	2	2	2	2	C		SD		3
1,2,3-Trichloropropane	6								CAS No	CAS No							

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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	
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								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								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
Tricresyl phosphate (containing 1% or more ortho-isomer)	699								CAS No	1330-78-5							
Tridecane	1333	0	NI	0	NI	0	NI	0	0	0	(1)	1	0			Fp	2
Tridecane	701								CAS No	629-50-5							
Tridecanoic acid	1334	5	NI	5	(R)	3	NI	(0)	(0)	(1)	(1)	(1)				Fp	2
Tridecanoic acid	702								CAS No	638-53-9							
Tridecyl acetate	1768	5	NI	5	NI	0	NI	0	(0)	(2)	2	2				F	2
Tridecyl acetate	703								CAS No	1072-33-9							
Triethanolamine	1338	0	0	0	R	1	NI	0	0	(2)	1	2				D	2
Triethanolamine	704								CAS No	102-71-6							
3-(Triethoxysilyl)propylamine	2445	1	1	1	R	1	NI	1	0	(3)	3B	3	Ss			D	3
3-(Triethoxysilyl)propylamine	3824								CAS No	919-30-2							
Triethylamine	1339	1	0	0	R	3	0	1	2	2	2	3				D	3
Triethylamine	706								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								CAS No	25340-18-5							
Triethylene glycol	1341	0	NI	0	R	0	0	0	0	0	0	0				D	0
Triethylene glycol	708								CAS No	112-27-6							
Triethylenetetramine	1346	0	NI	0	NR	3	NI	0	2	(3)	3	3	Ss			D	3
Triethylenetetramine	709								CAS No	112-24-3							
Triethylenetetramine/2-piperazine-1-ylethylamine mixtures (#)	2456	0	NI	0	NR	2	NI	0	2	(3)	3	3	Ss			D	3
Triethylenetetramine/2-piperazine-1-ylethylamine mixtures (#)	3872								CAS No								
Triethyl phosphate	1348	0	0	0	NR	1	0	1	0	0	(2)	(2)				D	2
Triethyl phosphate	705								CAS No	78-40-0							
Triethyl phosphite	1349	0	NI	0	R	1	NI	1	0	2	1	2	Ss			FE	2
Triethyl phosphite	710								CAS No	122-52-1							

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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
Trixylyl phosphate	1377	5	4	4	NR	4	1	(0)	(1)	(0)	(1)	(1)	R	S		3
Trixylyl phosphate	721								CAS No	25155-23-1						
Tung oil	1378	0	NI	0	R	(2)	NI	(0)	(0)	(1)	(0)	(1)		Fp		2
Tung oil	2784								CAS No							
Turpentine (wood)	1379	4	NI	4	NI	4	NI	0	(0)	1	(2)	2	SsA	(T)	D	2
Turpentine	722								CAS No	8006-64-2						
Undecanoic acid	1381	4	NI	4	(R)	3	NI	(0)	(0)	(2)	1	(2)		Fp		2
Undecanoic acid	723								CAS No	112-37-8						
1-Undecanol	1382	4	NI	4	R	4	NI	0	0	(2)	2	(1)		Fp		2
Undecyl alcohol	724								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								CAS No	821-95-4						
Urea	1384	0	0	0	R	1	NI	0	0	(1)	1	(1)		D		1
Urea solution	726								CAS No	57-13-6						
Urea	1384	0	0	0	R	1	NI	0	0	(1)	1	(1)		D		1
Urea	2627								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								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								CAS No							
Urea/Ammonium nitrate solution (containing < 1% aq. ammonia)	1387	0	NI	0	R	(2)	(0)	0	0	(1)	(1)	(1)		D		1
Urea/Ammonium nitrate solution (containing less than 1% free ammonia)	729								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								CAS No							
Urea-formaldehyde resin solution	1388	NI	NI	NI	NI	1	NI	1	1	NI	NI	NI	Ss	NI		2
Urea formaldehyde resin solution	725								CAS No							
Vegetable acid oils	2371	0	NI	0	R	0	NI	(0)	(0)	(1)	(1)	(1)		Fp		2
Vegetable acid oils (m)	3138								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								CAS No							

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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				
Vegetable protein solution,hydrolyzed	1398	0	NI	0	R	0	NI	(0)	(0)	(0)	(0)	(0)				D	0			
Vegetable protein solution (hydrolysed)	734								CAS No											
Vinyl acetate	1400	0	NI	0	R	2	NI	1	0	2	1	1	C			ED	3			
Vinyl acetate	735								CAS No											
Vinyl ethyl ether	1405	1	NI	1	NR	1	NI	0	0	0	1	1				E	2			
Vinyl ethyl ether	736								CAS No											
Vinylidene chloride	1406	2	1	1	NR	2	NI	2	0	(2)	2	2	M			SD	3			
Vinylidene chloride	738								CAS No											
Vinyl neodecanoate	1404	5	NI	5	NR	3	NI	0	0	(3)	3	3				F	3			
Vinyl neodecanoate	737								CAS No											
Vinyl toluenes	1409	3	3	3	NR	3	NI	0	0	2	2	1	NM	(T)		F	3			
Vinyltoluene	739								CAS No											
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								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								CAS No											
Xylene (mixed isomers)	1408	3	NI	3	NR	3	0	0	0	0	2	2		(T)		FE	2			
Xylenes	743								CAS No											
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								CAS No											
Xylenols (mixtures)	1422	2	NI	2	R	3	NI	1	2	(3)	3	3		(T)		Fp	3			
Xylenol	744								CAS No											
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								CAS No											
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								CAS No											
Zinc alkenylcarboxamide (LOA)	2053	NI	0	0	NR	0	NI	0	0	(1)	1	(1)				Fp	2			
Zinc alkenyl carboxamide	746								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								CAS No											

ANNEX 6

REVIEW OF SENSITIZERS

EHS Name	EHS No.	Conclusions Column D3	Consequential Changes to E3 Ratings
1. Acrylamide	23	C M N Ss	
2. Acrylonitrile	25	C M Ss	
3. Alachlor (ISO)	1488	C Ss	
4. Alkenyl succinic anhydride	298	Ss Sr	
5. Alkyl amine, alkenyl acid ester, mixture	1433		2
6. Alkyl (C7-C9) nitrates	8		
7. Alkyl(C18-C28)toluenesulphonic acid (>90% in mineral oil)	2429	Ss	
8. Alkyl(C18-C28)toluenesulphonic acid, calcium salts, borated (up to 70% in mineral oil)	2404	Ss	
9. Alkyl(C18-C28)toluenesulphonic acid, calcium salts, high overbase (up to 70% in mineral oil)	2373	Ss	
10. Alkyl(C18-C28)toluenesulphonic acid, calcium salts, low overbase (up to 60% in mineral oil)	2409	Ss	
11. Aminoethylethanolamine	68	Ss Sr	
12. Aminoethylethanolamine/Aminoethyldiethanolamine solution	74	Ss Sr	
13. N-Aminoethylpiperazine	88	Ss	
14. Amyl acetate	255		
15. Aniline	261	C T Ss	
16. Benzene sulphonyl chloride	320	Ss	
17. Benzyl chloride	352	C Ss A	
18. Butyl acrylate	390	Ss A	
19. Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	2295	Ss	
20. Butyl methacrylate	409	Ss	
21. Calcium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	70	Ss	
22. Calcium long chain alkaryl sulphonate (C11-C50) (LOA)	1973		1
23. Calcium long-chain alkyl (C18-C28) salicylate	2383	Ss	
24. Cashew nut shell oil (untreated)	443	Ss	
25. Chlorohydrins	463	C	
26. N-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less)	2286	C	
27. 4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt solution	1536		
28. Crotonaldehyde	528		
29. Crude Piperazine	2331	Ss Sr	
30. Crude Tall Oil	2357	Ss	
31. 1,5,9-Cyclododecatriene	534	A	
32. Cyclohexylamine	542		
33. Dichloropropane and dichloropropene, mixture	608	C Ss	
34. 1,3-Dichloropropene	612	C Ss	
35. Diethylene triamine	638	Ss	
36. Diglycidyl ether of Bisphenol A	653	Ss	
37. Diglycidyl ether of Bisphenol F	728	Ss R	
38. Dimethylamine (40-50% aq.sol.)	661	Ss	

EHS Name	EHS No.	Conclusions Column D3	Consequential Changes to E3 Ratings
39. Dipentene	686	Ss	
40. Diphenylamine, reaction product with 2,4,4-trimethylpentene	1500		2
41. Diphenylamines, alkylated	1770		2
42. Diphenylmethane-4,4'-diisocyanate	700	Ss Sr	
43. Ditridecyl adipate	2351		
44. tert-Dodecanethiol	2233	Ss	
45. Epichlorohydrin	731	C Ss	
46. Ethanoltriazine (aqueous solution)	2411	Ss	
47. Ethoxylated tallow amine (>95%)	2313		
48. Ethoxylated tallow amine, glycol mixture	2252		
49. Ethyl acrylate	734	C Ss	
50. Ethylene diamine	758	Ss Sr	
51. Ethylene glycol acrylate	869	M Ss	
52. Ethylene oxide	77	C M R	
53. 2-Ethylhexyl acrylate	782	Ss	
54. Ethyl methacrylate	785	Ss	
55. Formaldehyde (37%-50% solution)	807	C M Ss	
56. Glyoxal solutions (40% or less)	84	M Ss Sr	
57. Glyoxylic acid	1535	Ss	
58. Hexamethylene diamine	845	R	
59. Hexamethylene diisocyanate	2142	Ss Sr	
60. Hexamethylene tetramine (40% solution)	849	Ss	
61. Isobutyl methacrylate	408	Ss	
62. Isophorone diamine	880	Ss	
63. Isophorone diisocyanate	881	Ss Sr A	
64. Linear alkyl (C12-16) propoxyamine ethoxylate	2380		
65. Long-chain alkylphenate/Phenol sulphide mixture	1754		2
66. Magnesium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	71	Ss	
67. Magnesium long chain alkaryl sulphonate (C11-C50) (LOA)	1967		2
68. Maleic anhydride	921	Ss Sr	
69. 2-Mercaptobenzothiazol	925	Ss	
70. Metam-sodium (ISO)	202	Ss	
71. Methacrylonitrile	949	Ss	
72. Methyl acrylate	955	M Ss	
73. Methylene dithiocyanate	2235	Ss	
74. Methyl methacrylate	995	Ss	
75. 3-(Methylthio) propionaldehyde	993	N Ss	
76. Metolachlor (ISO)	113	Ss	
77. Pentaethylene hexamine	1103	Ss	
78. 1,5-Pentanedial solution, (5-50%)	1107	Ss Sr	
79. Phthalic anhydride (molten)	1146	Ss Sr	
80. alpha-Pinene	40	Ss	
81. beta-Pinene	41	Ss	
82. Pine oil	1148	Ss	
83. Piperazine, 68% Aqueous	2433	N Sr Ss	
84. Polyethylene amines / paraffin mixtures	1991	Ss	
85. Polyethylene polyamines	2367	Ss	

EHS Name	EHS No.	Conclusions Column D3	Consequential Changes to E3 Ratings
86. Polymethylene polyphenyl isocyanate	1153	Ss Sr	
87. Rosin	1219	Ss	
88. Sodium chlorate solid and solutions (50% or less)	1244		
89. Sodium dichromate solution	487	C M Ss Sr	
90. Sodium hypochlorite solutions containing 20% and less but more than 2% NaOCl	1256		
91. Sodium hypochlorite solutions containing more than 20% NaOCl	1255		
92. Sodium petroleum sulphonate	1860		
93. Tall oil, crude and distilled	1285	Ss	
94. Tall oil soap, crude	2432	Ss	
95. Tetraethylene pentamine	1302	Ss	
96. Toluene diisocyanate	1315	C Ss Sr	
97. 2,4-Tolylenediamine	1317	C M Ss	
98. Tributyl phosphate	1319		2
99. Triethylenetetramine	1346	Ss	
100. Triethyl phosphite	1349	Ss	
101. 2,4,4-Trimethyl hexamethylene diamine	1359	Ss	
102. Trimethyl hexamethylene diisocyanate	1360	Ss Sr	
103. Turpentine (wood)	1379	A Ss	
104. Urea-formaldehyde resin solution	1388	Ss	
105. Zinc bromide solutions	2227	Ss	

ANNEX 7

**DRAFT AGENDA FOR THE FIFTY-THIRD SESSION
OF THE GESAMP/EHS WORKING GROUP**

- 1 Adoption of the agenda
 - 2 Outcome of other bodies
 - 3 Evaluation of new substances
 - 4 Correspondence with industry/government
 - 5 Classification issues
 - 6 Consolidation of existing data files
 - 7 Communication and publication
 - 8 Any other business
 - 9 Future Work Programme
 - 10 Consideration and adoption of the report
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