



## Acknowledgment:

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## Abbreviations:

<b>C-</b>	Carcinogenic
<b>CAS:</b>	Chemical Abstract Service
<b>CMR-</b>	Carcinogenic, Mutagenic (developmental Toxin) and Reproductive Hazard
<b>EDCs:</b>	Endocrine Disrupting Chemicals
<b>GHS:</b>	Globally Harmonized System of Classification and Labelling of Chemicals
<b>HCWH:</b>	Health Care Without Harm
<b>IARC:</b>	International Agency for Research on Cancer
<b>M-</b>	Mutagenic hazard
<b>ODS:</b>	Ozone-Depleting Substances
<b>PBT-</b>	Persistent, Bioaccumulative and Toxic
<b>POPs:</b>	Persistent Organic Pollutants
<b>REACH:</b>	Registration Evaluation and Authorization of Chemical Substances Regulation
<b>R-</b>	Reproductive hazard
<b>S-</b>	Sensitive to skin and other organs
<b>SDGs:</b>	Sustainable Development Goals
<b>SPHS</b>	Sustainable Procurement in the Health Sector
<b>T-</b>	Toxicity
<b>UNDP:</b>	United Nations Development Programme
<b>vPvB-</b>	very Persistent and very Bioaccumulative
<b>WHO:</b>	World Health Organization

## 1. About the document:

This document includes a list of chemicals of concern to human health and the environment. The list is based on systematic evidence reviews from authoritative sources, which identify chemical and material hazards of concern that are carcinogenic, mutagenic, endocrine disrupting and reproductive hazards (health hazards) and bio-accumulative and persistent to the environment and/or listed in International Environmental instruments (Conventions). The authoritative lists and conventions referred to during the process of shortlisting of chemicals of concern are:

- WHO's International Agency for Research in Cancer (IARC) list of probable and known human carcinogens;
- The European Union list of Substances of Very High Concern and Restricted Substance List as determined under the Registration Evaluation and Authorization of Chemical Substances (REACH) Regulation.
- The California Proposition 65: Safe Drinking Water and Toxic Enforcement Act of 1986;
- The Minamata Convention on Mercury
- The Stockholm Convention on Persistent Organic Pollutants
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Information about Chemical Abstract Service (CAS) registration number and hazard statements taken from the UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS) are included for the listed chemicals. Where information was available the list includes additional data on the use of certain chemicals in health products.

Based on the information from the authoritative lists and the global environmental conventions the chemicals listed in the document are known for their environmental and health hazard and must be avoided or substituted where possible.

The intended audience for the list are health sector procurement officers, sustainability coordinators, and others concerned with procuring and using safer and more sustainable materials. The list will also be shared with the suppliers, who are requested to identify products that contain these chemicals so that procurers can avoid them and substitute less hazardous, clinically appropriate alternatives.

This 1st version of the list of chemicals of concern will be updated regularly as new information becomes available.

A detailed analysis of each chemical and its applica-

tion in health products and services will be undertaken in phase II of the project. This will help health-care facilities and procurement officers gather information on the type of hazard, the application and uses of these identified hazardous chemicals and compounds in general and more specifically in products used in the health sector.

The identification and assessment of safer alternative chemicals and materials will then allow the health sector to procure and use more sustainable products to provide safe, healthy and more environmentally friendly health-care services.

## 2. Context:

Chemicals are widely used in daily life. They have a unique importance in the health-care sector, where they are used as disinfectants, cleaners, laboratory reagents, sterilants, pesticides, medicines and pharmaceuticals and in medical devices and equipment. The hazards of these chemicals are not well understood by health professionals nor incorporated into procurement decisions.

To minimize these hazards, the health sector has been taking steps to promote and implement sustainable healthcare within their institutions and to collaborate externally with suppliers and manufactures to advance sustainable procurement within the health sector. The Sustainable Development Goals (SDGs) and the 2030 agenda are important drivers to promote sustainable health care systems. Specifically the SDG 3 on good health and wellbeing and SDG12 on sustainable consumption and production are key contributors.

The UN's commitment to 'lead by example' towards climate neutrality started a decade ago on 5 June 2007 when UN Secretary-General Ban Ki-moon publicly called on all UN agencies, funds and programmes to 'go green' and become climate neutral. In this effort the UN agencies individually and collectively through the Sustainable UN programme (SUN) advance the agenda of a 'green UN'. The UN informal interagency task team on Sustainable Procurement in Health Sector (SPHS)<sup>1</sup> and the recent UN agencies joint statement "Engaging with suppliers and manufacturers to promote environmentally and socially responsible procurement of health commodities"<sup>2</sup> are important tools to signal the suppliers and the manufacturers the intent of UN towards sustainable procurement.

<sup>1</sup> <http://savinglivesustainably.org>

<sup>2</sup> <http://savinglivesustainably.org/news/87777K.html>



This document has compiled a list of chemicals of concern, containing approximately 200 chemicals identified on the basis of their hazardous nature to human health and/or the environment. The list is intended to help procurement specialists, sustainability coordinators and others in the health sector evaluate the hazards associated with these chemicals and identify less hazardous alternatives in order to facilitate sustainable procurement.

To further promote these initiatives the UNDP, as the secretariat of SPHS, and Health Care Without Harm (HCWH) with its extensive experience working with the health sector to promote healthier and greener hospitals have been engaged jointly to strengthen the green procurement initiative within the health sector and foster collaboration between UN agencies and civil society partners. This document is a joint effort between UNDP and HCWH to identify and shortlist hazardous chemicals from various authoritative lists and environmental conventions intended to be used by the procurement specialists and others in the health sector to help identify hazardous chemicals in their supply chain.

### 3. Process of shortlisting the chemicals of concern:

Various authoritative bodies have conducted extensive studies and systemic evidence reviews to characterize chemicals for their hazard potential. This document compiles a list of these highly hazardous chemicals / mixtures/ polymers from the authoritative lists and the international environmental conventions. The chemicals in the document are identified by their Chemical Abstract Service (CAS) registry number and a health and/ or environmental hazard classification based on the UN Globally Harmonized System of Classification and Labelling of Chemicals. The 200 chemicals included in the document are those chemicals listed in two or more authoritative lists and/or are included in the environmental conventions.

This 1st version of the list of chemicals of concern will be updated regularly as new information becomes available.

A detailed analysis of each chemical and its application in health products and services will be undertaken in phase II of the project. This will help healthcare facilities and procurement officers gather information on the type of hazard and the application of the chemicals and compounds in general and more specially in products used in the health sector.

The identification and assessment of safer alternative chemicals and materials will then allow the health sector to procure and use more sustainable products to

provide safer, healthier and environmentally friendly healthcare services.

#### 3.1 Criteria for Hazard identification:

##### Health and environmental impacts of hazardous chemicals

In this document the criteria for hazard identification of the chemicals listed are based on the impacts of the chemicals on human health and the environment. The specific parameters are listed below.

Health affects linked to:

- Toxicity (such as Carcinogens, Mutagens, Reproductive hazards - CMR)
- Endocrine disrupting chemicals (EDCs)
- Neurotoxicity, developmental toxicity and immuno-toxicity
- Allergenicity/asthmagenicity
- Sensitization
- Skin and eye irritation

Environmental determinants linked to:

- Persistent, bio accumulative and toxic substances in the products
- Acute and chronic aquatic toxicity

The list has been developed and adapted from the review of evidence underlying the following authoritative lists for chemical and material hazards of concern that are carcinogenic, mutagenic, or reproductive hazards and/or listed in International Environmental instruments (Conventions):

- The International Agency for Research in Cancer (IARC) list of probable and known human carcinogens;
- The California list of chemicals known to the state to cause cancer or reproductive toxicity under the California Proposition 65: Safe Drinking Water and Toxic Enforcement Act of 1986;
- The European Union list of Substances of Very High Concern and Restricted Substance List as determined under the REACH Regulation. These include: carcinogenic, mutagenic or toxic to reproduction (CMR), Persistent, Bioaccumulative and Toxic (PBT) substance and some endocrine disruptors;
- The Minamata Convention on Mercury
- The Stockholm Convention on Persistent Organic Pollutants
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

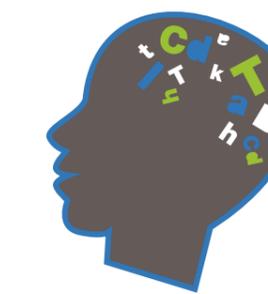
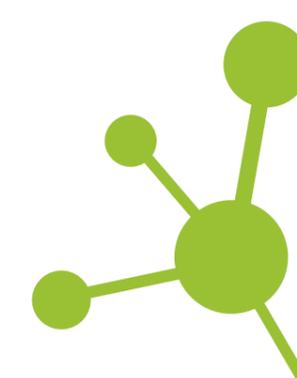
- The list also includes WHO's "Ten chemicals of major public health concern": Arsenic, Asbestos, Benzene, Cadmium, Dioxin and dioxin-like substances, Lead, Mercury and highly hazardous pesticides.<sup>3</sup>
- The Montreal Protocol on Substances that Deplete the Ozone Layer<sup>4</sup> was excluded from this systematic review for the list of chemicals of concern. Chemicals used in metered-dose inhalers for the treatment of asthma were identified by the Montreal Protocol (MP) as Ozone-Depleting Substances (ODS) and received an initial exemption from listing because of their 'essential use' in health care but were subsequently phased out when alternatives became available. Refrigerants in coolers used to keep vaccines cold in the immunization cold chain formerly contained ODS and were eliminated as required in the WHO Prequalification Standard for this equipment. These good practice examples demonstrate the impact of a global environmental convention on improving the safety and sustainability of essential medications and cold chain equipment.

#### 3.2 A brief overview of the Authoritative Lists and the Environmental Conventions:

- 1. IARC<sup>5</sup> - WHO's International Agency for Research on Cancer-** This agency is the lead international agency that has classified substances based on their carcinogenicity. The IARC Monographs identify environmental factors that can increase the risk of human cancer. These include chemicals, complex mixtures, occupational exposures, physical agents, biological agents, and lifestyle factors. National health agencies use this information as scientific support for their actions to prevent exposure to potential carcinogens. Agents are selected for review on the basis of two main criteria: (a) there is evidence of human exposure and (b) there is some evidence or suspicion of carcinogenicity. IARC classifies carcinogens into various (4) groups based on their carcinogenetic nature.
- 2. REACH<sup>6</sup> (Registration Evaluation and Authorization of Chemical Substances)** is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. The REACH regulation sets out an

approach for the control of the manufacture, import and use of chemicals in the EU. REACH has set up a system for better control of "substances of very high concern" such as those that accumulate in the environment and our bodies, cause cancer, are toxic to reproduction or alter genes, and substances that interfere with the hormone system.

- 3. California Proposition 65<sup>7</sup>:** Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The Proposition was intended by its authors to protect California citizens and the State's drinking water sources from chemicals known to cause cancer, birth defects or other reproductive harm, and to inform citizens about exposures to such chemicals.



<sup>3</sup> [http://www.who.int/ipcs/assessment/public\\_health/chemicals\\_phc/en/](http://www.who.int/ipcs/assessment/public_health/chemicals_phc/en/)

<sup>4</sup> Inhalers and coolants relevant to the health sector have not been included in the list from the Montreal Protocol

<sup>5</sup> <http://monographs.iarc.fr/ENG/Classification/index.php>

<sup>6</sup> <https://echa.europa.eu/regulations/reach/understanding-reach>

<sup>7</sup> <http://oehha.ca.gov/proposition-65/how-chemicals-are-added-proposition-65-list>

## International Conventions:

- **Stockholm Convention on Persistent Organic Pollutants (POPs)**<sup>8</sup>: This Convention aims to protect human health and the environment from the harmful impacts of persistent organic pollutants (POPs) by eliminating and/or controlling the production, trade, use and releases of POPs. The Convention introduces three levels of control for POPs:
  - Substances that Parties must eliminate in their production and use. Annex A to the convention have substances that parties must prohibit in production and use. Annex B have substances that parties must restrict in production and use. Annex C have substances that parties must reduce from unintentional releases. The chemicals of concern list includes the substances listed in all the three annexes. The Stockholm Convention was adapted on 22nd May 2001 and came into force on 17th May 2004 and came into force and has 128 countries have ratified the convention<sup>9</sup>.
- **Minamata Convention on Mercury**<sup>10</sup> The objective of this Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. Mercury is recognized as a substance producing significant adverse neurological and other health effects, with particular concerns expressed about its harmful effects on unborn children and infants. Global health initiatives procure and use a large variety of mercury-added equipment and medical products such as thermometers and blood pressure devices, and some general products such as batteries or fluorescent lamps.

Health-care facilities are one of the sources of mercury release into the atmosphere because of emissions from the incineration of healthcare waste. In the United States, healthcare waste incinerators may have been responsible for as much as 10% of all mercury air releases in the past. Minamata Convention was adopted on 10th Oct 2013, came into force on 16th Aug 2017 and has 92 ratifications.<sup>11</sup>

- **Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade**<sup>12</sup> The Convention promotes shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals and pesticides in order to protect human health and the environment from potential harm. It also contributes to the environmentally sound use of those hazardous chemicals by facilitating information exchange about their characteristics. The chemicals listed in Annex III of the Convention are included in the list. The chemicals listed in Annex III of the Convention include pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by two or more Parties and which the Conference of the Parties has decided to subject to PIC procedure. Rotterdam Convention was adopted on 10th Sept 1998, came into force on 24th Feb 2004 and 159 countries have signed the convention.<sup>13</sup>

<sup>8</sup> <http://chm.pops.int/TheConvention/ThePOPs/AllPOPs/tabid/2509/Default.aspx>

<sup>9</sup> <http://chm.pops.int/Countries/StatusofRatifications/PartiesandSignatoires/tabid/4500/Default.aspx>

<sup>10</sup> <http://www.mercuryconvention.org/Convention>

<sup>11</sup> <http://www.mercuryconvention.org/News/50ratificationmilestonereachedon-18May2017/tabid/5938/language/en-US/Default.aspx>

<sup>12</sup> <http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals/tabid/1132/language/en-US/Default.aspx>

<sup>13</sup> <http://www.pic.int/Countries/Statusofratifications/tabid/1072/language/en-US/Default.aspx>

## 3.3 Labeling and Classification of the Chemicals

The chemicals listed in the document have been classified by the unified classification and labelling identified globally. Each chemical has been provided with a Chemical Abstract Service (CAS) registry number and a hazard labelling from the UN Global Harmonization System of Classification and Labelling. This classification and hazard labelling will help health care facilities understand the hazards linked with the chemicals and further classify the hazards in their work places as well as to look for safer alternatives and eliminate these chemicals when possible.

### Global Harmonized System of classification and labelling<sup>14</sup>

- To unify the variety of classification and labeling of chemicals by international and national regulatory systems, the United Nations developed the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The GHS is an international harmonized standard for classification and labelling of chemicals and mixtures and hazard communication via safety data sheets. This is an ongoing process as more chemicals and mixtures are being classified by the GHS. Although implementation of the GHS is not a legally binding regulation, it is increasingly being adopted by countries: including in European Union Law as the CLP regulation, 2008; Australia, 2015; Argentina, 2015; and the US Occupational Safety and Health Administration (OSHA) effective June 2015.

The classification system is based on 28 hazard classes comprising physical hazards (16 classes), human health (10 classes), and environmental hazards (2 classes: aquatic hazards and more recently hazards to the ozone layer).



Explosives



Harmful/ Irritant



Flammables



Toxicity



Oxidizers



Corrosive



Gases under pressure



Dangerous for the Environment



Health Hazard

<sup>14</sup> [https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs\\_rev07/English/ST\\_SG\\_AC10\\_30\\_Rev7e.pdf](https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf)



## Annex 1: International Agency for Research in Cancer (IARC) <sup>15</sup>:

WHO's International Agency for Research in Cancer IARC develops Monographs on the carcinogenic risk of chemicals to humans. A Monograph represents the first step in carcinogen risk assessment, which involves examination of all relevant information in order to assess the strength of the available evidence that an agent could alter the age-specific incidence of cancer in humans.

IARC classifies a carcinogenic agent as entity or circumstance that is subject to evaluation in a Monograph, this includes chemicals, groups of related chemicals, complex mixtures, occupational or environmental exposures, cultural or behavioural practices, biological organisms and physical agents. Agents are selected for review on the basis of two main criteria: (a) there is evidence of human exposure and (b) there is some evidence or suspicion of carcinogenicity. IARC classifies carcinogens into 4 groups:

### Group 1: The agent is carcinogenic to humans.

This category is used when there is sufficient evidence of carcinogenicity in humans. Exceptionally, an agent may be placed in this category when evidence of carcinogenicity in humans is less than sufficient but there is sufficient evidence of carcinogenicity in experimental animals and strong evidence in exposed humans that the agent acts through a relevant mechanism of carcinogenicity.

### Group 2.

This category includes agents for which, at one extreme, the degree of evidence of carcinogenicity in humans is almost sufficient, as well as those for which, at the other extreme, there are no human data but for which there is evidence of carcinogenicity in experimental animals. Agents are assigned to either Group 2A (probably carcinogenic to humans) or Group 2B (possibly carcinogenic to humans) on the basis of epidemiological and experimental evidence of carcinogenicity and mechanistic and other relevant data.

### Group 2A: The agent is probably carcinogenic to humans.

This category is used when there is limited evidence

of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. In some cases, an agent may be classified in this category when there is inadequate evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals and strong evidence that the carcinogenesis is mediated by a mechanism that also operates in humans.

### Group 2B: The agent is possibly carcinogenic to humans.

This category is used for agents for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of carcinogenicity in experimental animals.

### Group 3: The agent is not classifiable as to its carcinogenicity to humans.

This category is used most commonly for agents for which the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals.

Exceptionally, agents for which the evidence of carcinogenicity is inadequate in humans but sufficient in experimental animals may be placed in this category when there is strong evidence that the mechanism of carcinogenicity in experimental animals does not operate in humans.

An evaluation in Group 3 is not a determination of non-carcinogenicity or overall safety. It often means that further research is needed, especially when exposures are widespread or the cancer data are consistent with differing interpretations.

### Group 4: The agent is probably not carcinogenic to humans.

This category is used for agents for which there is evidence suggesting lack of carcinogenicity in humans and in experimental animals. In some instances, agents for which there is inadequate evidence of carcinogenicity in humans but evidence suggesting lack of carcinogenicity in experimental animals, consistently and strongly supported by a broad range of mechanistic and other relevant data, may be classified in this group.

## Annex 2: The California list of chemicals known to the state to cause cancer or reproductive toxicity under the California Proposition 65: Safe Drinking Water and Toxic Enforcement Act of 1986 <sup>16</sup>

Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The proposition protects the state's drinking water sources from being contaminated with chemicals known to cause cancer, birth defects or other reproductive harm, and requires businesses to inform Californians about exposures to such chemicals. Proposition 65 requires the state to maintain and update a list of chemicals known to the state to cause cancer or reproductive toxicity.<sup>17</sup> (Health and Safety Code section 25249.8).

The statute defines four ways for a chemical to be added to the Proposition 65 list.

### 1. Labor Code (LC)

At a minimum, the list must contain chemicals identified by reference in Labor Code section 6382(b)(1) or (d). Labor Code section 6382(b)(1) incorporates chemicals identified by the World Health Organization's International Agency for Research on Cancer (IARC) as causing cancer in humans or laboratory animals.

### 2. State's Qualified Experts (SQE)

Either of two independent committees of scientific and health experts can find that a chemical has been clearly shown to cause cancer or birth defects or other reproductive harm. These two committees—the Carcinogen Identification Committee (CIC) and the Developmental and Reproductive Toxicant Identification Committee (DARTIC) — meet at least once each year and are designated as the "State's Qualified Experts" for evaluation of chemicals under Proposition 65.

### 3. Authoritative Bodies (AB)

The CIC and DARTIC have designated certain organizations as "authoritative bodies." A chemical will be added to the Proposition 65 list if one of these authoritative bodies formally identifies it as causing cancer or birth defects or other reproductive harm.

The following organizations have been designated as authoritative bodies: the US Environmental Protection Agency, US Food and Drug Administration (US FDA),

National Institute for Occupational Safety and Health, the National Toxicology Program of the US Department of Health and Human Services, and IARC.

- Listing via the Authoritative Bodies (AB) Mechanism; Title 27, Cal. Code of Regs., section 25306<sup>18</sup>

### 4. Formally Required to be Labeled (FR)

If an agency of the state or federal government requires that a chemical be labeled or identified as causing cancer or birth defects or other reproductive harm, it will be added to the list. Most chemicals listed in this manner are prescription drugs that are required by the US FDA to contain warnings relating to cancer or birth defects or other reproductive harm.

Process for Listing and Delisting

Although Proposition 65 listing and delisting activities are expressly excluded from the requirements of the Administrative Procedure Act by Health and Safety Code section 25249.8(e), each procedure involves, at a minimum:

- Public notice that a chemical is under consideration for listing
- A public comment period
- Review of comments received
- Notice of the final decision

The figures describe OEHHA's practice for listing and reconsideration. The specific procedures and criteria for listing differ somewhat for each mechanism. Each figure identifies the specific authority for that mechanism. The figures do not themselves have any mandatory or regulatory effect.

As part of the law, the state is required to publish a list of chemicals that are "known to the State of California to cause cancer or reproductive toxicity." The list is updated at least once a year and now contains about 800 different chemicals. The complete list can be found on the California Office of Environmental Health Hazard Assessment (OEHHA) website.

Some of the substances listed by OEHHA can affect the reproductive systems of men and/or women. Others are thought to cause cancer. Scientists classify all of these cancer-related substances at least as probable carcinogens, meaning that they might cause cancer in some people. But not all of them are known carcinogens (known to cause cancer) by groups and experts outside the state of California. This means that not every compound labeled as a possible cancer-causing substance has been proven to the worldwide scientific community to actually cause cancer.

<sup>15</sup> <http://monographs.iarc.fr/ENG/Preamble/CurrentPreamble.pdf>  
IARC Monographs on the Evaluation of Carcinogenic Risk to Humans, Preamble, WHO, 2006

<sup>16</sup> <https://oehha.ca.gov/proposition-65/about-proposition-65>

<sup>17</sup> <http://oehha.ca.gov/proposition-65/how-chemicals-are-added-proposition-65-list>

<sup>18</sup> [https://govt.westlaw.com/calregs/Document/1470DC310D45011DEA95CA4428EC25FA0?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/calregs/Document/1470DC310D45011DEA95CA4428EC25FA0?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default))

## Annex 3. REACH: (Registration Evaluation and Authorization of Chemical Substances)

REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. REACH Regulation came into force on 1 June 2007. The REACH regulation sets out an approach for the control of the manufacture, import and use of chemicals in the EU.

Under the REACH regulations the chemical industry is obliged to provide basic health and safety information for all chemicals produced or marketed in quantities over 1 tonne a year per importer or producer, before placing them on the market ("no data, no market" principle). It also sets up a system for better control of "substances of very high concern" such as those that accumulate in the environment and our bodies, cause cancer, are toxic to reproduction or alter genes, and substances that interfere with the hormone system. REACH will require some of these substances to be substituted with safer alternatives, whenever these alternatives become available.

A Member State or European Chemicals Agency (ECHA) at the request of the European Commission, can propose a substance to be identified as a Substance of Very High Concern (SVHC). If identified, the substance is added to the Candidate List<sup>19</sup>, which includes candidate substances for possible inclusion in the Authorisation List (Annex XIV).<sup>20</sup>

The inclusion of a substance in the Candidate List creates legal obligations to companies manufacturing, importing or using such substances, whether on their own, in preparations or in articles.

The authorisation procedure aims to assure that the risks from Substances of Very High Concern are properly controlled and that these substances are progressively replaced by suitable alternatives while ensuring the good functioning of the EU internal market.

Substances with the following hazard properties may be identified as Substances of Very High Concern (SVHCs)<sup>21</sup>:

- Substances meeting the criteria for classification as carcinogenic, mutagenic or toxic for reproduction category 1A or 1B in accordance with Commission Regulation (EC) No 1272/2008 (CMR substances)
- Substances which are persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) according to REACH (Annex XIII)

- Substances identified on a case-by-case basis, for which there is scientific evidence of probable serious effects that cause an equivalent level of concern as with CMR or PBT/vPvB substances. Once SVHCs are included in the Authorisation List and become subject to authorisation. These substances cannot be placed on the market or used after a given date, unless an authorisation is granted for their specific use, or the use is exempted from authorisation. Manufacturers, importers or downstream users of a substance on the Authorisation List can apply for authorisation.

### Substances Restricted under REACH:

The restricted substances (on their own, in a mixture or in an article) are substances for which manufacture, placing on the market or use is limited or banned in the European Union.

The Annex XVII of the REACH regulation prepared by the European Chemicals Agency (ECHA) helps to facilitate the searching of restricted substances of the REACH Regulation, and the table provides additional information related to the specific restriction entry.

## Annex 4: List of GHS Hazard Statements

<b>H200:</b>	Unstable explosive
<b>H201:</b>	Explosive; mass explosion hazard
<b>H202:</b>	Explosive; severe projection hazard
<b>H203:</b>	Explosive; fire, blast or projection hazard
<b>H204:</b>	Fire or projection hazard
<b>H205:</b>	May mass explode in fire
<b>H206:</b>	Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced
<b>H207:</b>	Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced
<b>H208:</b>	Fire hazard; increased risk of explosion if desensitizing agent is reduced
<b>H220:</b>	Extremely flammable gas
<b>H221:</b>	Flammable gas
<b>H222:</b>	Extremely flammable aerosol
<b>H223:</b>	Flammable aerosol
<b>H224:</b>	Extremely flammable liquid and vapour
<b>H225:</b>	Highly flammable liquid and vapour
<b>H226:</b>	Flammable liquid and vapour
<b>H227:</b>	Combustible liquid
<b>H228:</b>	Flammable solid
<b>H229:</b>	Pressurized container: may burst if heated
<b>H230:</b>	May react explosively even in the absence of air

<b>H231:</b>	May react explosively even in the absence of air at elevated pressure and/or temperature
<b>H232:</b>	May ignite spontaneously if exposed to air
<b>H240:</b>	Heating may cause an explosion
<b>H241:</b>	Heating may cause a fire or explosion
<b>H242:</b>	Heating may cause a fire
<b>H250:</b>	Catches fire spontaneously if exposed to air
<b>H251:</b>	Self-heating; may catch fire
<b>H252:</b>	Self-heating in large quantities; may catch fire
<b>H260:</b>	In contact with water releases flammable gases which may ignite spontaneously
<b>H261:</b>	In contact with water releases flammable gas
<b>H270:</b>	May cause or intensify fire; oxidizer
<b>H271:</b>	May cause fire or explosion; strong oxidizer
<b>H272:</b>	May intensify fire; oxidizer
<b>H280:</b>	Contains gas under pressure; may explode if heated
<b>H281:</b>	Contains refrigerated gas; may cause cryogenic burns or injury
<b>H290:</b>	May be corrosive to metals
<b>H300:</b>	Fatal if swallowed
<b>H301:</b>	Toxic if swallowed
<b>H302:</b>	Harmful if swallowed
<b>H303:</b>	May be harmful if swallowed
<b>H304:</b>	May be fatal if swallowed and enters airways
<b>H305:</b>	May be harmful if swallowed and enters airways
<b>H310:</b>	Fatal in contact with skin
<b>H311:</b>	Toxic in contact with skin
<b>H312:</b>	Harmful in contact with skin
<b>H313:</b>	May be harmful in contact with skin
<b>H314:</b>	Causes severe skin burns and eye damage
<b>H315:</b>	Causes skin irritation
<b>H316:</b>	Causes mild skin irritation
<b>H317:</b>	May cause an allergic skin reaction
<b>H318:</b>	Causes serious eye damage
<b>H319:</b>	Causes serious eye irritation
<b>H320:</b>	Causes eye irritation
<b>H330:</b>	Fatal if inhaled
<b>H331:</b>	Toxic if inhaled
<b>H332:</b>	Harmful if inhaled
<b>H333:</b>	May be harmful if inhaled
<b>H334:</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled
<b>H335:</b>	May cause respiratory irritation
<b>H336:</b>	May cause drowsiness or dizziness
<b>H340:</b>	May cause genetic defects
<b>H341:</b>	Suspected of causing genetic defects
<b>H350:</b>	May cause cancer

<b>H351:</b>	Suspected of causing cancer
<b>H360:</b>	May damage fertility or the unborn child
<b>H361:</b>	Suspected of damaging fertility or the unborn child
<b>H361d:</b>	Suspected of damaging the unborn child
<b>H362:</b>	May cause harm to breast-fed children
<b>H370:</b>	Causes damage to organs
<b>H371:</b>	May cause damage to organs
<b>H372:</b>	Causes damage to organs through prolonged or repeated exposure
<b>H373:</b>	May cause damage to organs through prolonged or repeated exposure
<b>H400:</b>	Very toxic to aquatic life
<b>H401:</b>	Toxic to aquatic life
<b>H402:</b>	Harmful to aquatic life
<b>H410:</b>	Very toxic to aquatic life with long-lasting effects
<b>H411:</b>	Toxic to aquatic life with long-lasting effects
<b>H412:</b>	Harmful to aquatic life with long-lasting effects
<b>H413:</b>	May cause long-lasting harmful effects to aquatic life
<b>H420:</b>	Harms public health and the environment by destroying ozone in the upper atmosphere

## Description of the hazard categories<sup>22</sup>

Each hazard class contains at least one category. The hazard categories are assigned a number (e.g., 1, 2, etc.). Categories may also be called "types". Types are assigned an alphabetical letter (e.g., A, B, etc.). In a few cases, sub-categories are also specified. Subcategories are identified with a number and a letter (e.g., 1A and 1B).

Some hazard classes have only one category (e.g., corrosive to metals), others may have two categories (e.g., carcinogenicity (cancer)) or three categories (e.g., oxidizing liquids). There are a few hazard classes with five or more categories (e.g., organic peroxides). The category tells you about how hazardous the product is (that is, the severity of hazard).

- Category 1 is always the greatest level of hazard (that is, it is the most hazardous within that class). If Category 1 is further divided, Category 1A within the same hazard class is a greater hazard than category 1B.
- Category 2 within the same hazard class is more hazardous than category 3, and so on.

<sup>19</sup> <https://echa.europa.eu/candidate-list-table>

<sup>20</sup> <https://echa.europa.eu/authorisation-list>

<sup>21</sup> <https://echa.europa.eu/substances-of-very-high-concern-identification>

<sup>22</sup> Adopted from: [https://www.cco-hs.ca/oshanswers/chemicals/whmis\\_ghs/hazard\\_classes.html](https://www.cco-hs.ca/oshanswers/chemicals/whmis_ghs/hazard_classes.html)

## List of Chemicals of Concern

Data base of chemicals listed in Authoritative lists and Environmental conventions ( the rows highlighted below show the chemicals listed in those authoritative lists and conventions) the CAS No, GHS statement, occurrence/ usage, hazard potential

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
1-Amino-2,4-dibromoanthraquinone								81-49-2	H319: Causes serious eye irritation; H351 Suspected of causing cancer(2)	A dye or dye intermediate in the textile industry.	C (2b)	
1-Bromopropane								106-94-5	H225: Highly Flammable liquid and vapor[ 2] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H335: May cause respiratory irritation [3] H336: May cause drowsiness or dizziness [3] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child (1a.1b)H373: Causes damage to organs through prolonged or repeated exposure [2]	Solvent for adhesives, cleaning of metal surfaces, and dry-cleaning; aerosol propellant. For washing & cleaning products, extraction agents Used as intermediates in manufacture of other chemicals. In formulation of mixtures and/or re-packaging.	C (2b) M R	
1-Nitropyrene								5522-43-0	H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure[ 1] H413: May cause long lasting harmful effects to aquatic life [4]	Byproduct of combustion; predominant pyrene found in diesel emissions.	C (2a)	
1,1-Dichloroethane								75-34-3	H225: Highly Flammable liquid and vapor [2] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [ 2] H370: Causes damage to organs [1] H402: Harmful to aquatic life [3] H411: Toxic to aquatic life with long lasting effects [ 2]	Intermediate in chemical synthesis; solvent. Formerly used as a surgical anesthetic gas.	C	1,1-Dichloroethane is used as a surgical anesthetic gas.
1,1,1-Trichloroethane								71-55-6	H400: Very toxic to aquatic life[1] H410: Very toxic to aquatic life with long lasting effects [1]H420: Harms public health and the environment by destroying ozone in the upper atmosphere[1]	Solvent for adhesives, in metal degreasing and in the manufacture of vinylidene chloride. Other applications include its use in pesticides, textile processing, cutting fluids, aerosols, lubricants, cutting oil formulations, drain cleaners, shoe polishes, spot cleaners, printing inks and stain repellents.	C (3)	
1,1,1,2-Tetrachloroethane								630-20-6	H302: Harmful if swallowed [4]H320: Causes eye irritation[2B] H331: Toxic if inhaled[3] H335: May cause respiratory irritation [3]H341: Suspected of causing genetic defects [2]H351: Suspected of causing cancer [2]H373: Causes damage to organs through prolonged or repeated exposure [2] H402: Harmful to aquatic life[3] H412: Harmful to aquatic life with long lasting effects[3]	Solvent and in the manufacture of insecticides, herbicides, soil fumigants, bleaches, other chlorocarbon solvents and Paints and varnishes.	C (2b)	
1,1,2-Trichloroethane								79-00-5	H302: Harmful if swallowed [4] H315: Causes skin irritation[2] H320: Causes eye irritation [2b]H331: Toxic if inhaled [3]H351: Suspected of causing cancer [2] H370: Causes damage to organs[1] H372: Causes damage to organs through prolonged or repeated exposure [1]H402: Harmful to aquatic life[3]	In the manufacture of chemicals, other minor uses include as a solvent for fats, oils, waxes, resins and other products, and as a process solvent in pharmaceutical manufacture.	C (3)	
1,1,2,2-Tetrachloroethane								79-34-5	H302: Harmful if swallowed [4] H315: Causes skin irritation[2] H319: Causes serious eye irritation [2a]H331: Toxic if inhaled [3]H341: Suspected of causing genetic defects[2] H351: Suspected of causing cancer[2] H370: Causes damage to organs [1]H372: Causes damage to organs through prolonged or repeated exposure [1]	Solvent, degreaser, refrigerant, extractant; ingredient in paints and pesticides.	C (2b)	
1,2-dibromoethane (EDB) (Ethylene dibromide)								106-93-4	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [1, 2] H335: May cause respiratory irritation [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H411: Toxic to aquatic life with long lasting effects [2]	Fumigant insecticide, nematicide	C (2a) M R	
1,2-dichloroethane/Ethylene dichloride								107-06-2	H225: Highly Flammable liquid and vapor [2] H302: Harmful if swallowed [4] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H331: Toxic if inhaled [3] H335: May cause respiratory irritation [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B]	Insect fumigant for grains and orchards, solvent for resins and fats, gasoline additive to remove lead; chemical: Used in the production of vinyl chlorideprecursor to dry cleaning agent.	C (2b)	
1,2-Dichloropropane								78-87-5	H225: Highly Flammable liquid and vapor [2] H302: Harmful if swallowed [4] H316: Causes mild skin irritation [3] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3] H412: Harmful to aquatic life with long lasting effects [3]	Chemical intermediate in production of carbon tetrachloride and perchloroethylene; industrial solvent for fats, oils, resins, waxes, and rubber.	C (1)	

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
1,2,3-Trichloropropane								96-18-4	H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H332: Harmful if inhaled [4] H350: May cause cancer [1A, 1B] H360: May damage fertility or the unborn child [1A, 1B]	Used in the manufacture of: chemicals, rubber products and plastic products.	C (2a) M	
1,3-Butadiene								106-99-0	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H336: May cause drowsiness or dizziness [3] H340: May cause genetic defects [1A, 1B] H350: May cause cancer [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1]	Polymer component in production of synthetic rubber, plastic, and fuel; chemical intermediate (nylon); component of tobacco smoke.	C (1) M R PBT	
1,3-Propane sultone								1120-71-4	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B]	Used for scientific research and development and the manufacture of chemicals and electrical, electronic and optical equipment.	C (2a)	
1,6-Dinitropyrene								42397-64-8	H341: may cause genetic defects [2] H351: may cause cancer [2]	Found in diesel exhaust and particles derived from coal-burning.	C (2b)	
1,8-Dinitropyrene								42397-65-9	H341: may cause genetic defects [2] H351: may cause cancer [2]	Found in diesel exhaust and airborne particulates.	C (2b)	
2-naphthylamine								91-59-8	H302: Harmful if swallowed [4] H350: May cause cancer [1A, 1B] H411: Toxic to aquatic life with long lasting effects [2]	An intermediate in the manufacture of dyes, as an antioxidant in the rubber industry.	C (1)	
2-Nitrofluorene								607-57-8	H302: harmful if swallowed[4]; H341: causes genetic defects [2] H351: may cause cancer [2]	Byproduct of combustion- diesel engine exhaust, emissions from kerosene heaters, gas burners and liquified petroleum gas burners.	C (2b)	
2,3,7,8-Tetrachlorodibenzo-para-dioxin (PCDD)								1746-01-6	H300: Fatal if swallowed [1,2] H310: Fatal in contact with skin [1,2] H315: Causes skin irritation [2] H319: Causes serious eye [2a] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1a, 1b] H360: May damage fertility or the unborn child [1a,1b] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged exposure [1]	Byproduct of manufacture of chlorophenols, hexachlorophene, and herbicides; contaminant of the Agent Orange, PCBs, and pentachlorophenol; component of combustion, including waste incineration and tobacco smoke.	C (1)	This is a by-product of medical waste incineration and listed as a POP by Stockholm Convention.
2,4-Dinitrotoluene								121-14-2	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H331: Toxic if inhaled [3] H341: may cause genetic defects [2] H350: may cause cancer [1a,1b] H361: Suspected of damaging fertility or the unborn child [2] H373: Causes damage to organs through prolonged exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Chemical intermediate in manufacture of polyurethanes and dye processes; gelatinizing and waterproofing agent in explosives.	C (2b) M	
2,4-Hexadienal								142-83-6	H227: Combustible liquid [4] H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H314: Causes severe skin burns and eye [1a,b,c] H318: Causes serious eye damage [1] H351: Suspected of causing cancer[2]	As a chemical intermediate in various organic synthetic reactions and as a raw material in the manufacture of sorbic acid (a widely used food preservative).	C (2b)	As a pharmaceutical intermediate in the manufacture of mitomycins and antihypercholesterolemics.
2,4,5-T and its salts and esters								93-76-5		Most countries have controlled 2,4,5-T for reasons of the high toxicity of the 2,3,7,8 TCDD contaminant.	PBT C	
2,6-Dinitrotoluene								606-20-2	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H331: Toxic if inhaled [3] H341: may cause genetic defects [2] H350: may cause cancer [1a,1b] H361: Suspected of damaging fertility or unborn child [2] H373: Causes damage to organs through prolonged exposure [2] H412: Harmful to aquatic life with long lasting effects [3]	Production of waterproofing for explosives, plasticizer in propellants; chemical intermediate in production of TNT, urethane polymers, flexible and rigid foams, surface coatings, and dyes.	C (2b) R	
3,3'-Dichlorobenzidine								91-94-1	H312: Harmful in contact with skin [4] H317: causes allergic skin reaction [1] H350: may cause cancer [1a,1b] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Curing agent for solid urethane plastics.	C (2b)	
3,7-Dinitrofluoranthene								105735-71-5	H341: may cause genetic defects [2] H351: may cause cancer [2]	Component of diesel emissions, incomplete combustion products of liquefied petroleum gas.	C (2b)	
3,9-Dinitrofluoranthene								22506-53-2	H341: may cause genetic defects [2] H351: may cause cancer [2]	Component of diesel emissions, incomplete combustion products of liquefied petroleum gas.	C (2b)	

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
4-Methylimidazole								822-36-6	H301: Toxic if swallowed [3] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H373: Causes damage to organs through prolonged or repeated exposure [2]	Component of caramel coloring agents used in foods and drinks; found in cooked food as byproduct of browning reaction.	C (2b)	
4-Nitrobiphenyl								92-93-3	H350: Suspected of causing cancer [1a,1b] H411: Toxic to aquatic life with long lasting effects [2]	Formerly used in manufacture of 4-diphenylamine.	C (3)	
4-Nitropyrene								57835-92-4	H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2]	Research chemical (induces cancer). Formerly found in toners for photocopy machines, but has not been found in detectable levels since 1980.	C (2b)	
4-Vinylcyclohexene								100-40-3	H351: Suspected of causing cancer [2]	Manufacture of polyolefins and other chemicals; solvent; chemical intermediate in production of flame retardants, flavors, and fragrances; byproduct of processes involving 1,3-butadiene.	C (2b) R	
6-Nitrochrysene								7496-028	H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2]	By product of combustion.	C (2a)	
Acetamide								60-35-5	H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2]	Plasticizer, industrial solvent; component of tobacco smoke.	C (2b)	
Acrylamide								79-06-1	H301: Toxic if swallowed [3] H312: Harmful in contact with skin [4] H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2a] H332: Harmful if inhaled [4] H340: may causes genetic defects [1a,1b] H350: may causes cancer [1a,1b] H361: Suspected of damaging fertility or the unborn child [2] H372: Causes damage to organs through prolonged exposure [1]	A reactive monomer and intermediate in the production of organic chemicals and in the synthesis of polyacrylamides. Acrylamide is also used as a flocculent for sewage and waste treatment, soil conditioning agents, ore processing, paper and textile industries, and in the manufacture of dyes, adhesives, and permanent press fabrics.	C (2a) M R S	
Alachlor								15972-60-8	H302: Harmful if swallowed [4] H316: Causes mild skin irritation [3] H317: May cause an allergic skin reaction [1] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Pesticide used as a weed control.	PBT	
Aldicarb								116-06-3	H300: Fatal if swallowed [1, 2], H311: Toxic in contact with skin [3], H330: Fatal if inhaled [1, 2], H400: Very toxic to aquatic life [1], H410: Very toxic to aquatic life with long lasting effects [1]	Insecticide	C (3) T	
Aldrin								309-00-2	H300: Fatal if swallowed [1, 2] H310: Fatal in contact with skin [1, 2] H316: Causes mild skin irritation [3] H320: Causes eye irritation [2B] H330: Fatal if inhaled [1, 2] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests.	PBT C (2a)	
Alpha hexachlorocyclohexane								319-84-6		Although the intentional use of alpha-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane.	PBT C	
Aniline								62-53-3	H227: Combustible liquid [4] H302: Harmful if swallowed [4] H311: Toxic in contact with skin [3] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [1, 2] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1]	Solvent, antiknock additive to gasoline; chemical intermediate in production of rubber, herbicides, dyes and pigments, resins, varnishes, polyurethane, explosives; component of tobacco smoke.	C (3)	
Anthracene								120-12-7	H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2b] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Is used as an intermediate in manufacture of another substance and manufacture of chemicals.	PBT C (3)	
Anthracene oil								90640-80-5	H340: may cause genetic defects H350: may cause cancer	This substance has an industrial use resulting in manufacture of another substance (use of intermediates).	CMS	

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Anthraquinone								84-65-1	H320: causes eye irritation [2b] H373: causes damage to organs through prolonged exposure [2] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Production of dyes, paper, pharmaceuticals; bird repellent on seeds, gas generator in satellite balloons.	C (2b)	
Antimony oxide (Antimony trioxide)								1309-64-4	H351: Suspected of causing cancer [2]	Component of flame retardant treatment for polymers; opacifying agent for glasses, ceramics, and enamels; specialty pigments; naturally occurring as valentinite and senarmontite.	C (2b)	Used as a component of flame retardant.
Arsenic								7440-38-2	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H330: Fatal if inhaled [1,2] H350: May cause cancer [1a,1b] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged exposure [1]	Wood preservative, herbicide, nonferrous alloys, medicine (leukemia treatment); component of tobacco smoke. Formerly used in optical glass.	C (1) acute toxic and hazardous to environment	Medicine for Leukemia treatment.
Arsenic acid								7778-39-4	H301: Toxic if swallowed [3] H312: Harmful in contact with skin [4] H314: Causes severe skin burns and eye damage [1A, B, C] H331: Harmful if inhaled [3] H341: Suspected of causing genetic defects [2] H350: may cause cancer [1a,1b] H373: Causes damage to organs through prolonged or repeated exposure [2]	Used for the manufacture of: metals, fabricated metal products and electrical, electronic and optical equipment.	C (1)	
Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)								1332-21-4 77536-67-5 12172-73-5 77536-66-4 12001-29-5 12001-28-4 77536-68-6	H350: may cause cancer [1a]. H372: Causes damage to organs through prolonged exposure [1]	Roofing, thermal and electrical insulation, cement pipe and sheets, flooring, gaskets, friction materials (e.g. brake pads and shoes), coating and compounds, plastics, textiles, paper, mastics, thread, fiber jointing, and millboard.	C (1)	Asbestos has been used in the past in construction of buildings including health care facilities.
Azacitidine								320-67-2	H302: Harmful if swallowed [4] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H360: May damage fertility or the unborn child [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1]	Medicine (treatment of myelodysplastic syndrome).	C (2a)	Used in the health sector as a pharmaceutical drug.
Azinphos-methyl								86-50-0	H300: Fatal if swallowed [1, 2], H310: Fatal in contact with skin [1, 2], H317: May cause an allergic skin reaction [1], H320: Causes eye irritation [2B], H330: Fatal if inhaled [1, 2], H361: Suspected of damaging fertility or the unborn child [2], H370: Causes damage to organs [1], H372: Causes damage to organs through prolonged or repeated exposure [1], H400: Very toxic to aquatic life [1], H410: Very toxic to aquatic life with long lasting effects [1]	Pesticide	T	
Azobenzene								103-33-3	H302: Harmful if swallowed [4] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1a,1b] H373: Causes damage to organs through prolonged exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Chemical intermediate in production of dyes, rubber accelerators, benzidine, insecticides, and pyrazolone derivatives. Formerly used as greenhouse fumigant against insects and mites.	C (3)	
Benzene								71-43-2	H225: Highly Flammable liquid and vapor [2] H304: May be fatal if swallowed and enters airways [1] H315: Causes skin irritation [2] H340: May cause genetic defects [1a,1b] H350: May cause cancer [1a,1b] H372: Causes damage to organs through prolonged exposure [1]	Additive in gasoline, solvent, oil extraction, photogravure printing, veterinary medicine (disinfectant); production of detergents, explosives, pharmaceuticals, and dyestuffs; chemical intermediate in production of ethylbenzene (styrene), cumene, cyclohexane; component of combustion emissions and tobacco smoke.	C (1) MR	
Benzidine								92-87-5	H302: harmful if swallowed [4] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1a,1b] H372: Causes damage to organs through prolonged exposure [1] H401: Toxic to aquatic life [2] H411: Very toxic to aquatic life with long lasting effects [2]	Reagent base for the production of a large number of dyes, particularly azo dyes for wool, cotton, and leather. Earlier used in clinical laboratories for detection of blood.	C (1)	Some dyes used as stains for microscopy and similar laboratory applications may contain benzidine as an impurity.
Benzyl butyl phthalate (BBP)								85-68-7	H320: Causes eye irritation [2B] H335: May cause respiratory irritation [3] H360: May damage fertility or the unborn child [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	Plasticizer for PVC, vinyl foams, polymer coatings for textiles.	C (3) M	
Beta hexachlorocyclohexane								319-85-7	H301: Toxic if swallowed [3] H312 (94.44%): Harmful in contact with skin [4] H332: Harmful if inhaled [4] H362 (100%): May cause harm to breast-fed children H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Although the intentional use of beta-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane.	BPT	
Betel quid with tobacco										Recreational stimulant, often containing betel leaf, areca nut, and/or slaked lime.	C (1)	

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
Binapacryl								485-31-4	H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H360: May damage fertility or the unborn child [1A, 1B] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Used as a pesticide, fungicide and miticide.	R	
Bis (2-ethylhexyl)phthalate (DEHP)								117-81-7	H320: Causes eye irritation [2B] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	The major use of DEHP is in the production of PVC and vinyl chloride resins, where it is added to plastics to make them flexible.	C (2b) M R	DEHP has been used extensively as a plasticizer in PVC medical devices. Most DEHP, greater than 90%, is used as a plasticizer in the manufacture of PVC products including floorings, wall coverings, furniture, consumer goods such as luggage, and medical applications (Bizzari, et al., 2000). d
Bis(2-methoxyethyl) ether								111-96-6	H226: Flammable liquid and vapor [3] H320: Causes eye irritation [2B] H361: Suspected of damaging fertility or the unborn child [2]	This substance is used in polymers, laboratory chemicals and pharmaceuticals.	R	
Bisphenol A (BPA)								80-05-7	H303: May be harmful if swallowed [5] H313: May be harmful in contact with skin [5] H317: May cause an allergic skin reaction [1] H318: Causes serious eye damage [1] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H373: Causes damage to organs through prolonged or repeated exposure [2] H401: Toxic to aquatic life [2]	Used to make certain plastics and epoxy resins. BPA-based plastic is made into a variety of common consumer goods, such as water bottles, sports equipment, CDs, and DVDs. Epoxy resins containing BPA are used as coatings on the inside of many food and beverage cans and in making thermal paper such as that used in sales receipts.	R	TBisphenol A is used in medical devices as lining of tubings used in neonatal and in ICU and bloodbag Medical devices made from polycarbonate plastic such as intravenous administration sets, stopcocks, syringes, intravascular catheters, urinary catheters, gastrointestinal tubes, and cardiopulmonary bypass circuits are sources of exposure to BPA13-15.
Bisphenol A diglycidyl ether (Araldite)								1675-54-3	H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H401: Toxic to aquatic life [2] H411: Toxic to aquatic life with long lasting effects [2]	These chemicals are major components of epoxy resins.	C (3)	
Bitumens, extracts of steam-refined and air refined								8052-42-4		Major applications of bitumen are in paving for roads and air fields, hydraulic uses (such as dams, water reservoirs and sea-defence works), roofing, flooring and protection of metals against corrosion.	C	
Bromochloroacetic acid								5589-96-8		A research chemical.	C (2b)	
Bromodichloromethane								75-27-4	H402: Harmful to aquatic life [3] H411: Toxic to aquatic life with long lasting effects [2]	Chemical intermediate (organic). Found in drinking water as byproduct of chlorination process. Formerly used as flame retardant and solvent.	C (2b) M R	
Bromoethane								74-96-4	H225: Highly Flammable liquid and vapor [2] H302: Harmful if swallowed [4] H316: Causes mild skin irritation [3] H319: Causes serious eye irritation [2a] H333: May be harmful if inhaled [5] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H373: Causes damage to organs through prolonged or repeated exposure [2]	Ethylating agent	C (3)	
Bromoform								75-25-2	H302: Harmful if swallowed [4] H315: causes skin irritation [2] H319: causes serious eye irritation [2a] H341: Suspected of causing genetic defects [2] H351: suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H372: Causes damage to organs through prolonged exposure [1] H401: toxic to aquatic life [2] H411: toxic to aquatic life with long lasting effects [2]	Analytical reagent. Formerly used as solvent, a sedative medicine, flame retardant.	C (3)	A sedative medicine
Butylated hydroxyanisole(BHA)								25013-16-5	H317: May cause an allergic skin reaction [1] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H401: Toxic to aquatic life [2] H411: Toxic to aquatic life with long lasting effects [2]	Antioxidant and preservative in fat-containing food, food packaging, animal feed, cosmetics, and petroleum products.	C (2b)	

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Cadmium and cadmium compounds								7440-43-9	H250: Catches fire spontaneously if exposed to air [2] H330: Fatal if inhaled [1,2] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1a,1b] H372: Causes damage to organs through prolonged exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects[1]	Used in fabricated metal products, electrical, electronic Rechargeable batteries, corrosion-resistant electroplating, barrier to control neutrons in nuclear fission, alloys, dental amalgams, plastic (PVC) stabilizer, production of pigments, television phosphors, photoelectric cells, electronics, fungicides, photography and lithography, component of tobacco smoke.	C (1) MR	Cadmium is been used as a colouring agent for the Red waste collection bags within the health sector.
Captafol								2425-061	H303: May be harmful if swallowed [5] H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled [1] H340: May cause genetic defects [1A, 1B] H350: May cause cancer [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	A fungicide	C (2a)	
Captan								133-06-2	H303: May be harmful if swallowed [ 5] H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H318: Causes serious eye damage [1] H331: Toxic if inhaled [3] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Agricultural and ornamental fungicide, preservative, cosmetics, medicine (bacteriostatic agent).	C (3)	
Carbaryl								63-25-2	H302: Harmful if swallowed [4] H332: Harmful if inhaled [4] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1]	Carbamate insecticide	C (3) M R	
Carbazole								86-74-8	H351: Suspected to cause cancer [2] H373: Causes damage to organs through prolonged exposure [2] H410: Very toxic to aquatic life with long lasting effects [1]	Chemical intermediate in production of dyes; product of incomplete combustion of organic matter, component of tobacco smoke.	C (2b)	
Carbon black								1333-86-4		Reinforcing filler in tires and other rubber products, pigment in plastics, model compound for diesel soot in diesel oxidation experiments; produced by incomplete combustion of heavy petroleum products.	C (2b)	
Catechol								120-80-9	H301: toxic if swallowed [3] H311: Toxic in contact with skin H315: causes skin irritation [3] H317: May cause an allergic skin reaction [2] H318: Causes serious eye damage [1] H341: Suspected of causing genetic defects [2] H351: suspecting of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H401: toxic to aquatic life [2]	Production of pesticides, flavorings, and fragrances.	C (2b)	
Chlordane								57-74-9	H302: Harmful if swallowed [4] H311: Toxic in contact with skin [3] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Fumigant used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops, chlordane remains in the soil for a long time and has a reported half-life of one year.	PBT C (2b)	
Chlordecone								143-50-0	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Chlordecone is a synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide.	C (2b) PBT	
Chlordimeform								6164-98-3	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H316: Causes mild skin irritation [3] H320: Causes eye irritation [2B] H332: Harmful if inhaled [4] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	An insecticide	C (3)	
Chlorobenzilate								510-15-6	H302: Harmful if swallowed [4] H316: Causes mild skin irritation [3] H320: Causes eye irritation [2B] H370: Causes damage to organs [1] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	A pesticide	C (3)	

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Chloroethane								75-00-3	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H315: Causes skin irritation [2] H319: Causes serious eye irritation [2a] H351: Suspected of causing cancer [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3] H412: Harmful to aquatic life with long lasting effects [3]	This substance is used for the manufacture of: chemicals and rubber products, Refrigerant, aerosol propellant, blowing agent for foam packaging; medicine (anesthetic; 'dead tooth' diagnosis); chemical intermediate in production of thickening agents.	C (3)	(anesthetic; 'dead tooth' diagnosis)
Chloroform								67-66-3	H302: Harmful if swallowed [4] H315: Causes skin irritation [2] H318: Causes serious eye damage [1] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3] H410: Very toxic to aquatic life with long lasting effects [1]	Solvent, reagent; production of dyes, pesticides; chemical intermediate; component of tobacco smoke.	C (2b) M	
Chloroprene								126-99-8	H225: Highly Flammable liquid and vapor [2] H301: Toxic if swallowed [1] H310: Fatal in contact with skin [1,2] H315: Causes skin irritation [2] H319: Causes serious eye [2a] H331: Toxic if inhaled [3] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child H370: Causes damage to organs [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Production of polychloroprene solid (Neoprene, Bayprene) and polychloroprene liquid dispersions for manufacturing rubber products.	C (2b)	
Chromium (VI) compounds								18540-29-9		Production of stainless steel, textile dyes, wood preservatives, leather tanning, anti-corrosion and conversion coatings, electroplating.	C (1) M R	
Chrysene								218-01-9	H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Manufacture of dyes, research chemical; natural constituent of coal tar; component of creosote (wood preservative) and tobacco smoke.	C (2b)	
Cobalt and cobalt compounds								7440-48-4	H317: May cause an allergic skin reaction [1] H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled [1] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	This substance is used for formulation of mixtures and/or re-packaging. For the manufacture of: chemicals, fabricated metal products and electrical, electronic and optical equipment.	C (2b)	
Cumene								98-82-8	H226: Flammable liquid and vapor [3] H304: May be fatal if swallowed and enters airways [1] H320: Causes eye irritation [2b] H331: Toxic if inhaled [3] H351: Suspected of causing cancer [2] H370: Causes damage to organs [1] H401: Toxic to aquatic life [2] H411: Toxic to aquatic life with long lasting effects [2]	Cumene is used in a variety of petroleum products and in the production of cumene hydroperoxide.	C (2b)	
Cyclohexane (Lindane)								58-89-9, 110-82-7	H225: Highly Flammable liquid and vapor [2] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2a] H371: May cause damage to organs [2] H400: Very toxic to aquatic life [1] H412: Harmful to aquatic life with long lasting effects [3]	Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.	C (1) and PBT	Used for lice and scabies treatment.
Dantron (Chrysazin; 1,8-Dihydroxyanthraquinone)								117-10-2	H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Medicine (palliative- laxative), chemical intermediate (dyes), used as an antioxidant in synthetic lubricants, in the synthesis of experimental antitumor agents, as a fungicide and as an intermediate for making dyes.	C (2b)	Medicine (palliative- laxative), chemical intermediate (dyes)
DDT (4,4'-Dichlorodiphenyltrichloroethane)								50-29-3	H301: Toxic if swallowed [3] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Insecticide, a POP in Stockholm Convention, restricted use to public health vector control.	C (2a) M R PBT	Used for Vector control by the health sector.
Di-n-butyl phthalate (DBP)								84-74-2	H317: May cause an allergic skin reaction [1] H335: May cause respiratory irritation [3] H360: May damage fertility or the unborn child [Category 1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	Plasticizer in carpet backings, paints, adhesives, hair spray, and nail polish; ectoparasiticide.	M R	Plasticizer used in plastic products.
Di-n-hexyl phthalate (DnHP)								84-75-3	H360: May damage fertility or the unborn child [1A, 1B]	Production of plastisols.	R	Plasticizer used in plastic products.
Di(2-ethylhexyl)phthalate (DEHP)								117-81-7	H320: Causes eye irritation [2B] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	Plasticizer for many resins and elastomers; component of tobacco smoke.	C (2b) R and developmental toxin	DEHP is widely used as a plasticizer for PVC in medical devices.

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Diarsenic trioxide								1327-53-3		This substance is used in the following products: metals and semiconductors. This substance has an industrial use resulting in manufacture of another substance (use of intermediates).  This substance is used for the manufacture of: metals, chemicals and mineral products (e.g. plasters, cement).	C	
Dibenz[a,h]anthracene								53-70-3	H350: May cause cancer [1a,1b] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Research chemical; product of incomplete combustion; component of tobacco smoke.	C (2a)	
Dibromoacetic acid								631-64-1	H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H314: Causes severe skin burns and eye damage [Category 1A, B, C] H332: Harmful if inhaled [4]	Research chemical; water disinfection byproduct.	C (2b)	
Dibromoacetonitrile								3252-43-5	H301: Toxic if swallowed [3] H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H332: Harmful if inhaled [4] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1]	This has been used as an anti- microbial component (≤ 3%) of a metalworking fluid.	C (2b)	
Dichloroacetic acid								79-43-6	H290: May be corrosive to metals [ 1] H311: Toxic in contact with skin [3] H314: Causes severe skin burns and eye damage [1A, B, C] H318: Causes serious eye damage [1] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3]	Dichloroacetic acid, particularly in the form of its esters, is an intermediate in organic synthesis, used in the production of glyoxylic acid, dialkoxo and diaroxy acids, and sulfo- namides and in the preparation of iron chelates in the agricultural sector. It is also used as an as a medicinal disinfectant (substitute for formalin).	C (2b) R	Dichloroacetic acid is used in medical practice as a cauterizing agent. It rapidly penetrates and cauterizes the skin and keratins. Its cauterizing ability compares with that of electrocautery or freezing. It is used on calluses, hard and soft corns, xanthoma palpebrarum, seborrhoeic keratoses, in-grown nails, cysts and benign erosion of the cervix.
Dieldrin								60-57-1	H300: Fatal if swallowed [ 1, 2] H310: Fatal in contact with skin [1, 2] H330: Fatal if inhaled [ 1, 2] H360: May damage fertility or the unborn child [ 1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Used principally to control termites and textile pests, dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils. Its half-life in soil is approximately five years. The pesticide aldrin rapidly converts to dieldrin.		
Diisopropyl sulfate								2973-106	H302:Harmful if swallowed [4] H312: Harmful in contact with skin [4] H314: Causes severe skin burns and eye damage [1A, B, C] H318: Causes serious eye damage [1] H351: Suspected of causing cancer [2]	Chemical intermediate in preparation of isopropanol from propylene.	C (2b)	
Dimethylarsinic acid								75-60-5	H301: Toxic if swallowed [3] H331: Toxic if inhaled [3] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Arsenic and arsenic compounds have been produced and used commercially for centuries. Current and historical uses of arsenic include pharmaceuticals, wood preservatives, agricultural chemicals, and applications in the mining, metallurgical, glassmaking, and semiconductor industries.	C (2b)	
Dinitro-ortho-cresol (DNOC) and its salts (such as ammonium salt, potassium salt and sodium salt)								534-52-1	H300: Fatal if swallowed [1, 2], H310: Fatal in contact with skin [1, 2], H315: Causes skin irritation [2], H317: May cause an allergic skin reaction [1], H318: Causes serious eye damage [1], H330: Fatal if inhaled [1, 2], H341: Suspected of causing genetic defects [2] H400 (97.3%): Very toxic to aquatic life [1],H410 (100%): Very toxic to aquatic life with long lasting effects [1]	A pesticide	T	
Dinoseb and its salts and esters								88-85-7	H300: Fatal if swallowed [1, 2], H301: Toxic if swallowed [3], 310: Fatal in contact with skin [1, 2], H311: Toxic in contact with skin [3], H315: Causes skin irritation [2], H317: May cause an allergic skin reaction [1], H318: Causes serious eye damage [1], H319: Causes serious eye irritation [2A], H330: Fatal if inhaled [1, 2], H360: May damage fertility or the unborn child [1A, 1B], H400: Very toxic to aquatic life, H410: Very toxic to aquatic life with long lasting effects	A herbicide	R	

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Disperse Blue 1								2475-45-8	H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H318: Causes serious eye damage [1] H350: May cause cancer [1A, 1B]	Azo dye for hair, fabrics, synthetic fibers, fur, sheepskins, thermoplastics, and some personal care products; solvent dye in cellulose acetate plastics.	C (2b)	
Endosulfan and its related isomers								115-29-7; 33213-65-9; 959-98-8	H300: Fatal if swallowed [Danger Acute toxicity, oral - Category 1, 2] H312: Harmful in contact with skin [Warning Acute toxicity, dermal - Category 4] H330: Fatal if inhaled [Danger Acute toxicity, inhalation - Category 1, 2] H400: Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard - Category 1] H410: Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard - Category 1]	Endosulfan is an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ectoparasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy.	PBT	
Endrin								72-20-8	H300: Fatal if swallowed [1, 2] H310: Fatal in contact with skin [1, 2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Previously used as an insecticide, avicide, and rodenticide. This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control rodents such as mice and voles.	C (3) M PBT	
Engine exhaust, diesel										Exhaust from disease.	C (1)	
Epichlorohydrin								106-89-8	H226: Flammable liquid and vapor [Category 3] H301: Toxic if swallowed [Category 3] H311: Toxic in contact with skin [Category 3] H314: Causes severe skin burns and eye damage [Category 1A, B, C] H317: May cause an allergic skin reaction [Category 1] H331: Toxic if inhaled [Category 3] H335: May cause respiratory irritation [Category 3] H340: May cause genetic defects [Category 1A, 1B] H350: May cause cancer [Category 1A, 1B] H361: Suspected of damaging fertility or the unborn child [Category 2]	Production of synthetic materials, including epoxy and phenoxy resins, synthetic glycerol, and elastomers; solvent, fumigant; chemical intermediate.	C (2a) R S	
Ethylbenzene								100-41-4	H225: Highly Flammable liquid and vapor [2] H304: May be fatal if swallowed and enters airways [1] H320: Causes eye irritation [2B] H332: Harmful if inhaled [4] H336: May cause drowsiness or dizziness [3] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	Used in the production of Styrene, synthetic rubber, airplane fuel; component of tobacco smoke.	C (2b)	
Ethylene oxide								75-21-8	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H301: Toxic if swallowed [3] H315: Causes skin irritation [2] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H331: Toxic if inhaled [3] H340: May cause genetic defects [1A, 1B] H350: May cause cancer [1A, 1B] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3]	Agricultural product fumigant, disinfectant (hospital equipment), thermobaric weapons; organic chemical synthesis (ethylene glycol and higher glycols), production of detergents, solvents, plastics, adhesives, antifreeze, pharmaceuticals; component of tobacco smoke.	C (1) M R PBT	Ethylene Oxide is used as a sterilizing agent in health care facilities.
Fluoroacetamide								640-19-7	H300: Fatal if swallowed [1, 2] H310: Fatal in contact with skin [1, 2] H330: Fatal if inhaled [1, 2] H361: Suspected of damaging fertility or the unborn child [2] H371: May cause damage to organs [2]	A pesticide	T	
Formaldehyde								50-00-0	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H314: Causes severe skin burns and eye damage [1A, B, C] H317: May cause an allergic skin reaction [1] H331: Toxic if inhaled [C 3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B]	Disinfectant (antibacterial, fungicide), tissue fixative, photography (color negative stabilizer), textile treatment; precursor to polyfunctional alcohols; production of urea and melamine resins, phenolic resin, plastics, adhesives, preservatives, pressed wood products, automobile components; byproduct of combustion, component of tobacco smoke.	C (1)	Formaldehyde is used as a disinfectant and sterilant in both its liquid and gaseous states. Formaldehyde is used in composite wood products.
Furan								110-00-9	H224: Extremely flammable liquid and vapor [4] H315: Causes skin irritation [2] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H412: Harmful to aquatic life with long lasting effects [3]	Chemical intermediate; solvent for resins, production of lacquers, agricultural chemicals, stabilizers, and pharmaceuticals.	C (2b)	
Furazolidone								67-45-8		Medicine (antibacterial), veterinary medicine	C (3) S	Furazolidone is used as a medicine (antibacterial), veterinary medicine. It is used in human and veterinary medicine as an antibacterial and antiprotozoal agent.
Gamma-Radiation (also X- and Gamma-Radiation)										X-rays are used in many medical and technical applications. The most common are diagnostic X-ray examinations of the human body, and the analysis of materials.	C (1)	For radiation diagnostics.
Gasoline exhaust										Air pollution	C (2b)	

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Glu-P-2 (2-Aminodipyrido[1,2- <i>a</i> :3',2'- <i>c</i> ]imidazole)								67730-10-3		Found in cooked food as byproduct of browning reaction; component of tobacco smoke.	C (2b)	
Glycidol								556-52-5	H227: Combustible liquid [4] H302: Harmful if swallowed [Category 4] H312: Harmful in contact with skin [4] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H331: Toxic if inhaled [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [Category 1] H373: Causes damage to organs through prolonged or repeated exposure [2] H402: Harmful to aquatic life [3]	Stabilizer for vinyl polymers, diluent for epoxy resins; chemical intermediate in synthesis of pharmaceuticals; additive in lubricating oil and synthetic hydraulic fluids.	C (2a) R	
Griseofulvin								126-07-8	H340: May cause genetic defects [1A, 1B] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H371: May cause damage to organs [2] H373: Causes damage to organs through prolonged or repeated exposure [2]	Griseofulvin is an antibiotic fungistatic drug administered orally in the treatment of dermatophyte and ringworm infections.	C (2b) R S	Medicine (antifungal)
Heptachlor								76-44-8	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H351: Suspected of causing cancer [2] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Listed as a POP under Stockholm Convention Previously used as an insecticide; since 1988 in USA use is restricted to controlling fire ants in underground transformers. Insecticide primarily used to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes	C (2b) PBT	
Hexabromobiphenyl								36355-01-8		Hexabromobiphenyl is an industrial chemical that was used as a flame retardant. They are added to the plastics used to make products like computer monitors, televisions, textiles, plastic foams, etc. to make them difficult to burn. PBBs can leave these plastics and find their way into the environment. PBBs are usually colorless to off-white solids.	PBT C	
Hexabromocyclododecane (HBCD)								25637-99-4, 3194-55-6	H361: Suspected of damaging fertility or the unborn child [2] H362: May cause harm to breast-fed children [Reproductive toxicity, effects on or via lactation] H410: Very toxic to aquatic life with long lasting effects [1]	HBCD is used as a flame retardant additive, providing fire protection during the service life of vehicles, buildings or articles, as well as protection while stored. The main uses of HBCD globally are in expanded and extruded polystyrene foam insulation while the use in textile applications and electric and electronic appliances is small.	PBT	
Hexabromodiphenyl ether and heptabromodiphenyl ether								68631-49-2; 207122-15-4; 446255-22-7 207122-16-5		Hexabromodiphenyl ether and heptabromodiphenyl ether are the main components of commercial octabromodiphenyl ether.	PBT	
Hexachlorobenzene (HCB)								118-74-1	H332: Harmful if inhaled [4] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Used as fungicide for food crops. It was widely used to control wheat bunt. It is also a byproduct of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations.	PBT	
Hexachlorobutadiene								87-68-3	H227: Combustible liquid [4] H301: Toxic if swallowed [3] H312: Harmful in contact with skin [4] H317: May cause an allergic skin reaction [1] H330: Fatal if inhaled [1, 2] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Solvent, scrubber, mulling agent; diminishing use as algicide and herbicide. is also produced chiefly as a by-product in the manufacture of chlorinated solvents and related products, in which it occurs in the heavy fractions. Hexachlorobutadiene occurs as a by-product during the chlorinolysis of butane derivatives in the production of both carbon tetrachloride and tetrachloroethene.	C (3) PBT	
Hexachlorocyclohexanes (HCH)								608-73-1	H301: Toxic if swallowed [3], H312: Harmful in contact with skin [4], H332: Harmful if inhaled [4], H362: May cause harm to breast-fed children, H373: Causes damage to organs through prolonged or repeated exposure [2], H400: Very toxic to aquatic life [1], H410: Very toxic to aquatic life with long lasting effects [1]	An Insecticide	C (2b)	
Hexachloroethane								67-72-1	H303: May be harmful if swallowed [5] H316: Causes mild skin irritation [3] H320: Causes eye irritation [Category 2B] H351: Suspected of causing cancer [2] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [Category 1] H410: Very toxic to aquatic life with long lasting effects [1]	Solvent, combustion retardant in pyrotechnics and smoke-producing devices, veterinary medicine (anthelmintic); polymer additive, ingredient in fungicide and insecticide; metal and alloy production.	C (2b)	Hexachloroethane has veterinary uses.

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Hexamethylphosphoramide								680-31-9	H303: May be harmful if swallowed [5] H313: May be harmful in contact with skin [5] H315: Causes skin irritation [2] H340: May cause genetic defects [1A, 1B] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H371: May cause damage to organs [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	It is used as a solvent for polymers, a selective solvent for gases and as a thermal and ultraviolet radiation degradation stabilizer in various polymers.	C (2b) R	
Hydrazine								302-01-2	H226: Flammable liquid and vapor [3] H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H314: Causes severe skin burns and eye damage [1A, B, C] H317: May cause an allergic skin reaction [1] H331: Toxic if inhaled [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H410: Very toxic to aquatic life with long lasting effects [1]	Precursor to blowing agents, pesticides, pharmaceuticals (antitubercular, antifungals), corrosion inhibitor; aerospace propellant; production of dyes, photographic developer, spandex fibers, explosives, pesticides; reducing agent for many transition metals and some non-metals (arsenic, selenium, tellurium), as well as uranium and plutonium; proposed alternative to hydrogen in fuel cells; component of tobacco smoke.	C 2 (a)	
Indium phosphide								22398-80-7	H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Components in high-power and high frequency electronics, optoelectronics.	C 2 (a)	
IQ (2-Amino-3-methylimidazo[4,5-f]quinoline)								76180-96-6		Found in cooked food as byproduct of browning reaction; component of tobacco smoke.	C 2 (a)	
Lead and lead compounds								7439-92-1		Lead is used in batteries, ballast, electrodes, construction materials, glazes, and as a radiation shield. Lead is also a component of tobacco smoke. Lead compounds are used as glazes, pigments, anti-knock additives in aviation fuel, semiconductors, and ammunition.	C (2a) M R	
Maneb								12427-38-2	H252: Self-heating in large quantities; may catch fire [2] H261: In contact with water releases flammable gas [Category 3] H316: Causes mild skin irritation [3] H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H333: May be harmful if inhaled [5] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	MANEB is used in agriculture as a fungicide, a pesticide.	C (3)	
Me-A-alpha-C (2-Amino-3-methyl-9H-pyridol[2,3-b]indole)								68006-83-7		Found in cooked food as byproduct of browning reaction; component of tobacco smoke.	C (2b)	
Medroxyprogesterone acetate								71-58-9		A synthetic progestin has been used as a contraceptive that is effective both orally or by intramuscular injection and has also been used to treat breast and endometrial neoplasms.	C (2b) M	Medicine (contraceptive; antineoplastic)
MelQ (2-Amino-3,4-dimethylimidazo[4,5-f]quinoline)								77094-11-2		Found in cooked food as byproduct of browning reaction; component of tobacco smoke.	C (2b)	
MelQx (2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline)								77500-04-0		Found in cooked food as byproduct of browning reaction; component of tobacco smoke.	C (2b)	
Mercury and inorganic mercury compounds								7439-97-6(CAS numbers are included for 43 chemicals)	H317: May cause an allergic skin reaction [1] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [Category 1, 2] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Thermometers, sphygmomanometers, barometers, mirrors, lubricant, laboratory reagent; catalyst in oxidation of organic compounds, extraction of gold and silver from ores; manufacture of pulp, paper, switching devices, chlorine, caustic soda; component of batteries, dental amalgams; component of tobacco smoke.	C (3) MR	Mercury containing measuring devices - thermometers, blood pressure instruments, dental fillings are very common in health care facilities.
Methamidophos								10265-92-6	H300: Fatal if swallowed [1, 2], H310: Fatal in contact with skin [1, 2], H320: Causes eye irritation [2B], H330: Fatal if inhaled [1, 2], H371: May cause damage to organs [2], H373: Causes damage to organs through prolonged or repeated exposure [2], H400: Very toxic to aquatic life [1], H410: Very toxic to aquatic life with long lasting effects [1]	Used as an insecticide.	Highly Toxic	
Methyl carbamate								598-55-0	H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2]	Chemical intermediate in manufacture of resins to be applied to fabrics.	C (3)	
Methyl chloride								74-87-3	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H302: Harmful if swallowed [4] H332: Harmful if inhaled [4] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1]	Laboratory chemicals, washing & cleaning products and extraction agents. This substance has an industrial use resulting in manufacture of another substance (use of intermediates) and Herbicide.	C (3) M R	

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Methyl isobutyl ketone								108-10-1	H225: Highly Flammable liquid and vapor [2] H320: Causes eye irritation [2B] H331: Toxic if inhaled [3] H336: May cause drowsiness or dizziness [3] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Solvent, denaturant, excipient in drugs; component of adhesives used for packaging, transporting, or holding food.	C (2b) MR	
Methyleugenol								93-15-2	H302: Harmful if swallowed [4] H316: Causes mild skin irritation [3] H320: Causes eye irritation [2B] H350: May cause cancer [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2] H402: Harmful to aquatic life [3]	Used as a favouring agent in jellies, baked goods, non-alcoholic beverages, chewing gum, candy, puddings, relishes and ice cream. It is also widely used as a fragrance ingredient in perfumes, toiletries and detergents. Methyleugenol has been used as an anaesthetic in rodents.	C (2b)	
Mirex								2385-85-5	H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H315: Causes skin irritation [2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	This insecticide is used mainly to combat fire ants, and it has been used against other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods.	PBT C (2b)	
Monocrotophos								6923-22-4	H300: Fatal if swallowed [1, 2] H311: Toxic in contact with skin [3] H330: Fatal if inhaled [1, 2] H341: Suspected of causing genetic defects [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	An insecticide	Highly Toxic	
Naphthalene								91-20-3	H228: Flammable solid [2] H302: Harmful if swallowed [4] H317: May cause an allergic skin reaction [1] H320: Causes eye irritation [2B] H351: Suspected of causing cancer [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Household fumigant (mothballs, toilet deodorant blocks), pyrotechnics; chemical precursor to phthalic anhydride, 2-naphthol, surfactants, resins, dyes, insecticide, solvents, and others; component of petroleum, coal, and tobacco smoke.	C (2b)	
Nickel and its compounds								7440-02-0	H317: May cause an allergic skin reaction [1] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1] H412: Harmful to aquatic life with long lasting effects [3]	Alloys (low-alloy steels, stainless steel, copper and brass, permanent magnets, electrical resistance alloys), electroplated protective coatings, electroformed coatings, alkaline storage batteries, fuel cell electrodes, catalyst for methanation of fuel gases and hydrogenation of vegetable oils; component of tobacco smoke.	C S	
Nitrobenzene								98-95-3	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H331: Toxic if inhaled [3] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H372: Causes damage to organs through prolonged or repeated exposure [1] H411: Toxic to aquatic life with long lasting effects [2]	Nitrobenzene is used to manufacture aniline.	C (2b) R	
Nitrofurazone (Nitrofurazone)								59-87-0	H302: Harmful if swallowed [4] H317: May cause an allergic skin reaction [1]	Veterinary medicine (antibiotic) for dogs, cats, and horses not intended for human consumption. Medical use in humans discontinued in US.	C (3)	A topical anti-infective agent effective against gram-negative and gram-positive bacteria. It is used for superficial Wounds and injuries and skin infections. Nitrofurazone has also been administered orally in the treatment of Trypanosomiasis.
Nitrofurantoin								67-20-9	H302: Harmful if swallowed [4] H317: May cause an allergic skin reaction [1] H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled [1] H361: Suspected of damaging fertility or the unborn child [2]	An Antibacterial agent.	C (3) R	A urinary anti-infective agent effective against most gram-positive and gram-negative organisms. Although sulfonamides and antibiotics are usually the agents of choice for urinary tract infections, nitrofurantoin is widely used for prophylaxis and long-term suppression.
Nitromethane								75-52-5	H226: Flammable liquid and vapor [3] H302: Harmful if swallowed [4] H319: Causes serious eye irritation [2A] H332: Harmful if inhaled [4] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H371: May cause damage to organs [2] H373: Causes damage to organs through prolonged or repeated exposure [2] H412: Harmful to aquatic life with long lasting effects [3]	Synthesis of derivatives used as pharmaceuticals, agricultural fumigants, and industrial antimicrobials; solvent, fuel or fuel additive with methanol, explosives.	C (2b)	
o,p'-DDT and p,p'-DDT										See DDT	MR	

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Ochratoxin A								303-47-9	H300: Fatal if swallowed [1, 2] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [1, 2] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H362: May cause harm to breast-fed children H373: Causes damage to organs through prolonged or repeated exposure [2] H413: May cause long lasting harmful effects to aquatic life [4]	Ochratoxin A is produced by inoculating strains of the fungi that produce this compound on autoclaved grains and oilseed.	C (2b)	
Outdoor air pollution										Outdoor air pollution is a major cause of cancer. And Particulate matter, a major component of outdoor air pollution, has been evaluated separately and was also classified as carcinogenic to humans.	C (1)	Incineration/ open burning of medical waste is a major source of airpollution.
Oxazepam								604-75-1	H351: Suspected of causing cancer	Oxazepam is a benzodiazepine used in the treatment of anxiety, alcohol withdrawal, and insomnia.	C (2b) R	Drug for treatment of anxiety.
Palygorskite (Attapulgite) (long fibres, > 5 micrometres)								12174-11-7	H319: Causes serious eye irritation [2A] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Adhesives and Sealants, Paints and Coatings.		
Parathion								56-38-2	H330: Fatal if inhaled [1, 2] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	A pesticide	C (2b) T	
Pentachlorobenzene								608-93-5	H302: Harmful if swallowed [4] H361: Suspected of damaging fertility or the unborn child [2] H371: May cause damage to organs [2] H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate e.g. previously for the production of quinoxaline; might still be used as an intermediate; it is also produced unintentionally during combustion, thermal and industrial processes. It also present as impurities in products such as solvents or pesticides.	PBT	
Pentachloroethane								76-01-7	H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1] H411: Toxic to aquatic life with long lasting effects [2]	Produced commercially as a chemical intermediate.	C (3)	
Pentachlorophenol and its salts and esters								87-86-5	H301: Toxic if swallowed [3] H311: Toxic in contact with skin [3] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [1, 2] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	An insecticide and herbicide that has also been used primarily as wood preservatives on telephone poles, pilings and fence posts and control sap stain in green lumber and prevent the growth of mould and fungi, and as a preservative for waterproof materials.	C (1) PBT	
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride								Perfluorooctane sulfonic acid (CAS No: 1763-23-1), its salts and perfluorooctane sulfonyl fluoride (CAS No: 307-35-7), potassium perfluorooctane sulfonate (CAS No: 2795-39-3); lithium perfluorooctane sulfonate (CAS No: 29457-72-5); ammonium perfluorooctane sulfonate (CAS No: 29081-56-9); diethanolammonium perfluorooctane sulfonate (CAS No: 70225-14-8); tetraethylammonium perfluorooctane sulfonate (CAS No: 56773-42-3); didecyl dimethylammonium perfluorooctane sulfonate (CAS No: 251099-16-8)	H301: Toxic if swallowed [3] H320: Causes eye irritation [2B] H332: Harmful if inhaled [4] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1] H401: Toxic to aquatic life [2] H411: Toxic to aquatic life with long lasting effects [2]	PFOS is both intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread and includes: electric and electronic parts, fire fighting foam, photo imaging, hydraulic fluids and textiles.	PBT	
Phenobarbital								50-06-6	H301: Toxic if swallowed [3] H336: May cause drowsiness or dizziness [3] H340: May cause genetic defects [1A, 1B] H351: Suspected of causing cancer [2] H361: Suspected of damaging fertility or the unborn child [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Used as a medicine (sedative), laboratory reagent.	C (2b) R S	Phenobarbital is a sedative, hypnotic and anti-epileptic drug.
Polybrominated biphenyls (PBBs)								59536-65-1, 13654-09-6, 27858-07-7, 36355-01-8		Formerly used as flame retardant in synthetic fibers, lacquers, and molded plastics. Manufacture in US stopped in 1976.	C (2a)	

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Polychlorinated biphenyls including dioxin-like, with a Toxicity Equivalency Factor (TEF) according to WHO (PCBs 77, 81, 105, 114, 118, 123, 126, 156, 157, 167, 169, 189) including Polychlorinated dibenzo- <i>p</i> -dioxins (other than 2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin), polychlorinated dibenzo- <i>p</i> -dioxin (hexa and pentachlorodibenzodioxin)								1336-36-357653-85-7, 57653-85-8	H373: Causes damage to organs through prolonged or repeated exposure [2] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	PCBs have commonly been synthesized commercially by catalytic chlorination of biphenyl. These chemicals are produced unintentionally due to incomplete combustion, as well during the manufacture of pesticides and other chlorinated substances. They are emitted mostly from the burning of hospital waste, municipal waste, and hazardous waste, and also from automobile emissions, peat, coal, and wood. These compounds are used in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, and plastics.	C (1) M R PBT	PCBs were used in hundreds of industrial and commercial applications including: Electrical, heat transfer and hydraulic equipment Plasticizers in paints, plastics and rubber products Pigments, dyes and carbonless copy paper Other industrial applications.
Polychlorinated dibenzofurans										These compounds are produced unintentionally from many of the same processes that produce dioxins, and also during the production of PCBs. They have been detected in emissions from waste incinerators and automobiles. Furans are structurally similar to dioxins and share many of their toxic effects. Other major sources of PeCDF are metal smelting, refining, and processing; chemical manufacturing/processing (production of chlorophenols, PCBs, vinyl chloride); pulp bleaching.	PBT C (3)	Olychlorinated dibenzofurans are by-product of medical waste incineration and listed as a POP by Stockholm convention.
Polychlorinated naphthalenes								70776-03-3		Made by chemically reacting chlorine with naphthalene, a soft, pungent solid made from coal or petroleum and often used for mothproofing. PCN are unintentionally generated during high-temperature industrial processes in the presence of chlorine.	PBT C	
Polyvinyl chloride								9002-86-2	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated H315: Causes skin irritation [2] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3]	Polyvinyl Chloride (PVC) is a major plastics material which finds widespread use in building, transport, packaging, electrical/electronic and healthcare applications.	C (3)	See also vinyl chloride.
Potassium bromate								775-8-01-2		Laboratory reagent, oxidizer (food additive to fortify flour, permanent wave neutralizing solution, textile dyeing).	C (2b)	
Primidone								125-33-7		An anti-epileptic drug	C (2b) R	An anti-epileptic drug.
Pyridine								110-86-1	H225: Highly Flammable liquid and vapor [2] H302: Harmful if swallowed [4] H312: Harmful in contact with skin [4] H332: Harmful if inhaled [4]	It is also used as a solvent for paint, rubber, pharmaceuticals, polycarbonate resins and textile water repellants. Large amounts of pyridine are used as an intermediate in the manufacture of substituted pyridines, piperidine, agro-chemicals (herbicides: diquat, paraquat; insecticide: chlorpyrifos; fungicide: pyrimethanil), pharmaceuticals and other products.	C (3)	
Shale-oils								68308-34-9		Early applications of shale oils included use as a source of paraffin waxes and burning oils for lamps, as well as for medicinal purposes.	C (1)	Early uses for medical purposes.
Silica dust, crystalline, in the form of quartz or cristobalite								14808-60-7		Manufacture of glass, abrasives, ceramics, enamels, heat insulators, fire- and acid-proof packing materials; clarifying and filtration agent, molds for castings, decolorizing and purifying oil/petroleum, industrial filler.	C (1)	
Styrene								100-42-5	H226: Flammable liquid and vapor [3] H304: May be fatal if swallowed and enters airways [1] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H332: Harmful if inhaled [4] H341: Suspected of causing genetic defects [2] H351: Suspected of causing cancer [2] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H411: Toxic to aquatic life with long lasting effects [2]	Precursor to polystyrene and several copolymers; production of plastic, synthetic rubber, insulation and protective coatings, construction materials, vehicle components, food containers; flavoring agent; component of automobile and tobacco smoke	C (2b) PBT	
Surgical implants (see Ceramic implants, Dental materials, Implanted foreign bodies, Metallic implants, Organic polymeric materials, Orthopaedic implants, Polymeric implants, Silicone breast implants)										Used for surgical implants.	C (2b) (3)	Surgical implants

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
Tetrabromodiphenyl ether and pentabromodiphenyl ether								5436-43-1; 60348-60-9		Tetrabromodiphenyl ether and pentabromodiphenyl ether are the main components of commercial pentabromodiphenyl ether. Polybromodiphenyl ether inhibit or suppress combustion in organic materials and therefore are used as additive flame retardants.	PBT	
Tetrachloroethylene								127-18-4	H315: Causes skin irritation [2] H320: Causes eye irritation [2B] H332: Harmful if inhaled [4] H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Solvent for organic materials used in dry-cleaning, textile processing, and vapor-degreasing; chemical intermediate. Formerly used in medicine as a hookworm vermifuge.	C (2a)	Tetrachloroethylene used in medicine as a hookworm vermifuge.
Tetraethyl lead								78-00-2	H300+H310+H330: Fatal if swallowed, in contact with skin or if inhaled H300: Fatal if swallowed H310: Fatal in contact with skin H330: Fatal if inhaled H360: May damage fertility or the unborn child H373: Causes damage to organs through prolonged or repeated exposure H400: Very toxic to aquatic life H410 (98.08%): Very toxic to aquatic life with long lasting effects	This is a petrofuel additive.	T	
Tetrafluoroethylene								116-14-3	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated, H320: Causes eye irritation [2B] H351: Suspected of causing cancer [2] H371: May cause damage to organs [2] H373: Causes damage to organs through prolonged or repeated exposure [2]	Used in synthesis of fluoropolymers, for PFA manufacturing.	C (2a)	
Tetramethyl lead								75-74-1	H226: Flammable liquid and vapor H300+H310+H330: Fatal if swallowed, in contact with skin or if inhaled H300: Fatal if swallowed H302+H332: Harmful if swallowed or if inhaled [Warning Acute toxicity, oral; acute toxicity, inhalation] H310: Fatal in contact with skin H330: Fatal if inhaled H332: Harmful if inhaled H360: May damage fertility or the unborn child H373: Causes damage to organs through prolonged or repeated exposure H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long lasting effects	This is used in gasoline as a motor anti-knock additive.	T	
Tetranitromethane								509-14-8	H271: May cause fire or explosion; strong Oxidizer [1] H301: Toxic if swallowed [3] H319: Causes serious eye irritation [2A] H330: Fatal if inhaled [1, 2] H335: May cause respiratory irritation [3] H351: Suspected of causing cancer [2] H372: Causes damage to organs through prolonged or repeated exposure [1]	Oxidizing agent in rocket propellants; explosive; diesel fuel additive (increases cetane); reagent that detects double bonds in organic compounds.	C (2b) R	
Toluene								108-88-3	H225: Highly Flammable liquid and vapor [2] H304: May be fatal if swallowed and enters airways [1] H315: Causes skin irritation [2] H320: Causes eye irritation [2B] H332: Harmful if inhaled [4] H360: May damage fertility or the unborn child [1A, 1B] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H401: Toxic to aquatic life [2] H412: Harmful to aquatic life with long lasting effects [3]	This substance is used in the following products: fuels, lubricants and greases, anti-freeze products, biocides (e.g. disinfectants, pest control products), non-metal-surface treatment products, inks and toners, leather treatment products, polishes and waxes, textile treatment products and dyes and adhesives and sealants.	C (3) M	Used as a lab chemical among many other uses.
Toxaphene								8001-35-2		This insecticide is used on cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.	PBT	Veterinary medicine
Tributyltin compounds (Tributyltin chloride Tributyltin fluoride, Tributyltin linoleate, Tributyltin oxide, Tributyltin naphthenate, tributyltin methacrylate)								1461-22-9*	H301: Toxic if swallowed [3] H 312: Harmful in contact with skin [4] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H372: Causes damage to organs through prolonged or repeated exposure [1] H400: Very toxic to aquatic life [1] H410: Very toxic to aquatic life with long lasting effects [1]	Used in non-agricultural biocide pest control products. The most common use was in anti-fouling paints for ship hulls. It was also used as a biocide to prevent the fouling of appliances and equipment submerged in coastal and marine aquatic environments.		
Trichloroethylene								79-01-6	H305: May be fatal if swallowed and enters airways [2] H315: Causes skin irritation [2] H319: Causes serious eye irritation [2A] H332: Harmful if inhaled [4] H336: May cause drowsiness or dizziness [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H360: May damage fertility or the unborn child [1A, 1B] H372: Causes damage to organs through prolonged or repeated exposure [1] H401: Toxic to aquatic life [2] H411: Toxic to aquatic life with long lasting effects [2]	Metal degreasing, extraction solvent, cleaning kerosene-fueled rocket engines; production of refrigerants; component of tobacco smoke. Other release to the environment of this substance is likely to occur from: indoor use in close systems with minimal release (e.g. cooling liquids in refrigerators, oil-based electric heaters). Formerly used in medicine (inhaled analgesic), film cleaning, dry-cleaning solvent, and fumigant.	C(1) MR	Used as a lab chemical among many other uses. Formerly used in medicine (inhaled analgesic).

Shortlisted Chemicals and mixtures	IARC	Proposition 65 List	REACH Candidate List	REACH Restricted List	Stockholm Convention	Rotterdam Convention	Minamata Convention	CAS No	GHS Hazard Statements	Occurrence/ Use	Hazard Potential	Occurrence/ use in health sector
Tris(2-chloroethyl) phosphate								115-96-8	H302: Harmful if swallowed [Category 4] H316: Causes mild skin irritation [3] H320: Causes eye irritation [2B] H340: May cause genetic defects [1A, 1B] H361: Suspected of damaging fertility or the unborn child [2] H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3] H412: Harmful to aquatic life with long lasting effects [3]	Release to the environment of this substance is likely to occur from industrial use: in the production of articles. Used as a binding agent in paints and coatings or adhesives. This substance can be found in products with material based on: stone, plaster, cement, glass or ceramic (e.g. dishes, pots/pans, food storage containers, construction and isolation material) and metal (e.g. cutlery, pots, toys, jewellery).	C (3) R	
Vinyl chloride								75-01-4	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated. H315: Causes skin irritation [2] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H361: Suspected of damaging fertility or the unborn child H370: Causes damage to organs [1] H372: Causes damage to organs through prolonged or repeated exposure [1] H402: Harmful to aquatic life [3]	Chemical intermediate for production of PVC.	C (1)	
Vinyl fluoride								75-02-5	H220: Extremely flammable gas [1] H280: Contains gas under pressure; may explode if heated. H336: May cause drowsiness or dizziness [3] H341: Suspected of causing genetic defects [2] H350: May cause cancer [1A, 1B] H373: Causes damage to organs through prolonged or repeated exposure [2]	Used for production of PVF, sunlight resistant and used for solar transmission in solar panels.	C (2A)	Used for Fluoride- Medicine (prevent bone loss); result of sulfuric fluoride (pesticide, fumigant) decay. Compounds may be used as metal treatment, glass etching, aluminum smelting, pesticides, chemical synthesis, dental care products, or municipal public health water additive (prevents tooth decay).
Xylenes								1330-20-7	H226 - Flammable liquid and vapor H315 - Causes skin irritation H401 - Toxic to aquatic life	Solvent for paints, varnishes, inks, dyes, adhesives, pharmaceuticals, detergents, and rubber; production of polymer fiber (mylar and dacron); component of gasoline and fuel oils; component of tobacco smoke (m-p-).	C (3)	Used as a lab chemical among many other uses.

- PBT-** Persistent, Bioaccumulative and Toxic
- vPvB-** very Persistent and very Bioaccumulative
- CMR-** Carcinogenic Mutagenic (developmental Toxin) and Reproductive Hazard
- S-** Sensitive to skin and other organs
- C-** Carcinogenic
- R-** Reproductive hazard
- T-** Toxicity to humans





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The document, consolidated from authoritative United Nations, European Union and United States lists and Global Environmental Conventions, contains the Chemical Abstracts Service (CAS) registry number, hazard statements from the UN Globally Harmonized System of labeling of chemicals (GHS), and health products containing the chemicals where known.

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UNDP/HCWH Strengthening Sustainability in the Health Sector project as one of the tools developed to guide the procurement of safer alternatives to products containing hazardous chemical to protect health-care workers, patients, communities, and the environment.



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