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Use and emissions of hazardous substances in Norway, 2002-2007

Based on data from the Norwegian Product Register

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Preface

There is a continuous demand for knowledge concerning use and emissions of hazardous substances. Such information is not readily available due to a general lack of data and that the processes involved are highly complex. Statistics Norway, in cooperation with the Norwegian Pollution Control Authority, has for the past years been aiming at developing a statistics that will form a basis for assessing trends in emissions of hazardous substances.

Data from the Norwegian Product Register forms the basis for the analysis, and there is continually ongoing work to evaluate possible new data sources.

The statistics is a further development of the work carried out by Hansen (2006) and Kittilsen and Hansen (2008). The statistics on hazardous substances is still a work in progress. Thus, there will be continued need to improve emission factors, quality and completeness of activity data as well as the estimation model itself.

Acknowledgements:
This work was carried out in cooperation with Mette Follestad (Norwegian Pollution Control Authority- the Product Register). The uncertainty analysis was performed by Marie Lillehammer (Statistics Norway).

Marte O. Kittilsen and Kathrine Loe Hansen has contributed with valuable discussions during the analysis and writing process.

The project received financial support from the Norwegian Pollution Control Authority (SFT). Kari Løkken and Marit Kopangen at SFT have performed the extraction of substances to be hazard weighted, and made important consultative contributions during the work process.

Summary

Increased awareness of the effects of hazardous substances on human health and the environment has led to a growing demand for information regarding use and release patterns of such substances. For the past few years, Statistics Norway has been working on new statistics on the consumption and emission of hazardous substances in Norway. At present, the statistics cover the emissions of hazardous substances caused by the use of products that are subject to the duty of declaration to the Norwegian Product Register. The statistics include about 450 substances that are categorised as being CMR (may cause cancer, be mutagenic or generate reproductive disorders), chronically toxic, sensitising and/or dangerous for the environment.

The emission of hazardous substances to the surroundings (including air, soil and water) is calculated by multiplying the amount consumed of a substance by an emission factor. The emission estimates include diffuse emissions. This means that not only emissions from production of products containing the substance, but also emissions from the subsequent use of these products are included. The consumption of a substance is expressed as the sum of production and import, minus export, declared to the Product Register. The emission factor represents the fraction of the substance that is not incorporated into a new product, transformed into a new compound, or handled in some other way (e.g. as waste). The fraction of a hazardous substance emitted is assumed to be dependent both on the type of product used and the sector in which it is used.

The model and its emission factors have been gradually improved, incorporating an increasing amount of information. In the present model, the majority of the emission factors are specific for the combination of product type and industrial sector. Some are product-specific factors, while a few emission factors are specified for the combination of product type, industrial sector and substance. The first two groups of emission factors are obtained from two Swedish studies, while the substance-specific factors are based on consultations with relevant industry.

Each year approximately 6 million tonnes of around 450 selected hazardous substances is consumed. Roughly 0.3 per cent of these substances is emitted to the surroundings. In other words, around 19 000 tonnes of a long list of substances classified as CMR, chronically toxic, sensitising and/or dangerous for the environment find their way into the environment every year.

According to present estimates, emissions of CMR- and chronically toxic substances decreased from 2002-2004, but has since then increased again and are now roughly at the 2002 level. The emissions of sensitising substances have been relatively stable in the time period, while substances dangerous for the environment have shown an increase in emissions from 2002 to 2005, followed by a considerable decrease due to reduced consumption in the manufacturing industries.

While the overall emission levels are comparable in 2002 and 2007 for all hazard categories, there has been much variation at the more detailed level. There is substantial between-year variation in the number of substances being declared within each hazard category. Generally, for each hazard category, more substances entered than left the activity data between 2002 and 2007. In addition to the variability in number of substances included in the analysis, there is also variation in the emissions of each substance. More than twelve per cent of the CMR substances with maximum emissions above 50 tonnes had a variation of more than 50 per cent between maximum and minimum emissions (of years present). This percentage is lower for the other hazard categories, but there is still a considerable proportion of the substances showing large variation in emissions between years.

Trends in emissions of hazardous substances may be considered a rough indicator of the development of the risk of damage to human health and the environment caused by these substances. However, estimates of emissions are not measures of the actual risk. Firstly, not all hazardous substances or emission sources are covered. Secondly, a risk assessment would require the integration of more information, both about the recipient and about various properties of the substances. Thus, one of the first steps towards an approximate quantification of risk, is to give emission figures for different substances weights according to their hazardous properties.

A first attempt at such a hazard weighing has been performed for CMR substances and substances dangerous for the environment. The most hazardous CMR substances, evaluated on the basis of their R-sentences, were given weights ranging from one to ten, while the remaining received the weight one. For the substances dangerous for the environment, the risk phrases contain no information for evaluating hazard. For this hazard category, substances that are persistent (P), bioaccumulative (B) and toxic (T) (so-called PBT-substances) were given hazard weights ranging from one to ten, while the remaining substances dangerous for the environment received the hazard weighting one.

The hazard weighing is a first approach towards an assessment of hazardousness within each hazard category, and the weighing with a range of hazard weights gives an indication of how sensitive the trends are to the weighing procedure. The results should thus be interpreted with caution.

Depending on the size of the weight, the hazard weighing resulted in trends quite opposite of the emission time series. With a hazard weight of ten, the hazard weighted CMR substances showed a steady decrease from 2002 to 2007, while the hazard weighted substances dangerous for the environment showed a considerable increase from 2002 to 2005, followed by a slight decrease. This indicates that there may have been a shift from very hazardous to less hazardous substances within the CMR substances. For the substances dangerous for the environment, however, there seems to be an increased emission of PBT substances.

An uncertainty analysis has been performed for the emission estimates. This uncertainty analysis evaluates uncertainties in activity data and emission factors. The results show that the CMR- and chronically toxic substances have by far the highest uncertainties. This is a result of high consumption of energy goods, where the uncertainty in emission factors is rather high. An improvement of both activity data and emission factors for energy goods will thus result in a large improvement of the emission estimates.

Sammendrag

Økt oppmerksomhet rundt skadevirkningene av helse- og miljøfarlige stoffer har medført en voksende etterspørsel etter informasjon knyttet til bruk og utslipp av slike stoffer. De siste årene har Statistisk sentralbyrå arbeidet med å lage ny statistikk over forbruk og utslipp av helse- og miljøfarlige stoffer i Norge. Så langt dekker denne statistikken utslipp av et utvalg farlige stoffer grunnet bruk av merkepliktige produkter som er deklarert til det norske produktregisteret. Statistikken inkluderer rundt 450 stoffer som er kreftfremkallende (C), mutagene (M), reproduksjonsskadelige (R) (såkalte CMR-stoffer), kronisk giftige, allergifremkallende og/eller miljøskadelige.

Utslipp av farlige stoffer til omgivelsene (luft, jord og vann) er beregnet ved å multiplisere mengden av et gitt stoff brukt et gitt år med en utslippsfaktor. Stoffmengden brukt er summen av produksjon og import minus eksport, i henhold til deklarasjoner til Produktregisteret. Utslippsfaktoren er den andelen av stoffmengden brukt som ikke inngår i nye produkter, omdannes til andre stoffer (f.eks. ved forbrenning) eller håndteres på en eller annen måte som forhindrer utslipp (f.eks. avfallshåndtering). Andelen av et farlig stoff som slippes ut antas å avhenge av både typen produkt stoffet inngår i og i hvilken næring (private husholdninger inkludert) produktet brukes.

Modellen med tilhørende utslippsfaktorer har blitt gradvis forbedret siden den først ble laget. Stadig mer informasjon er integrert, for å gi så riktige utslippsestimater som mulig. I den foreliggende modellen er de aller fleste utslippsfaktorene både produkt- og næringsspesifikke. Noen utslippsfaktorer er kun produktspesifikke, og noen få er både produkt-, nærings- og stoffspesifikke. De to førstnevnte gruppene av utslippsfaktorer er hentet fra to ulike svenske studier, mens de stoffspesifikke faktorene er satt i samråd med aktuelle industribedrifter.

Resultatene viser at rundt 6 millioner tonn av et utvalg på rundt 450 farlige stoffer brukes hvert år. Av dette slippes om lag 0,3 prosent ut. Med andre ord havner årlig rundt 19 000 tonn av en rekke stoffer som er CMR, kronisk giftige, allergifremkallende eller har langtidsvirkende miljøeffekter i omgivelsene.

Ifølge estimatene sank utslippene av CMR-stoffer og kronisk giftige stoffer fra 2002-2004, men har siden den gang steget igjen, og utslippene ligger nå på 2002-nivå. Miljøskadelige stoffer med langtidsvirkning har hatt den motsatte trenden, med en økning i utslipp fra 2002 til 2005, og en påfølgende nedgang fram til 2007 på grunn av redusert forbruk i industrien. Allergifremkallende stoffer har kun hatt mindre variasjon i utslipp per år i perioden 2002 til 2007.

Selv om de overordnede utslippsnivåene var sammenlignbare i 2002 og 2007 for alle fareklassene, har det vært betydelig variasjon på et mer detaljert nivå. Det er stor variasjon mellom år når det gjelder antall stoffer som blir deklarert i hver fareklasse. Flere stoffer har kommet til enn forlatt statistikken i perioden fra 2002 til 2007. I tillegg til variasjonen i antall stoffer som er med i analysen, er det også variasjon i utslippene av hvert stoff. Mer enn tolv prosent av CMR-stoffene med maksimum utslipp på over femti tonn har en variasjon på mer enn femti prosent mellom maksimums- og minimumsutslipp i perioden. Denne prosentandelen er lavere for de andre fareklassene, men det er også her en betydelig andel av stoffene som viser stor variasjon mellom år.

Trenden i utslipp av helse- og miljøfarlige stoffer kan sees som en grov indikasjon på utviklingen i fare for skade på mennesker og miljø grunnet disse stoffene. Estimater på utslipp er imidlertid ikke et mål på faktisk risiko. For det første er ikke alle skadelige stoffer eller utslippskilder dekket. For det andre vil en risikovurdering kreve at man inkluderer mer informasjon, både om resipienten og om

egenskapene til det enkelte stoff. Et av de første skrittene mot en kvantifisering av risiko vil derfor være å gi de enkelte stoffene vekter etter hvor skadelige de er.

En første tilnærming til en slik farevekting har her blitt utført for CMR-stoffer og miljøfarlige stoffer med langtidsvirkning. De skadeligste CMR-stoffene, plukket ut basert på risikosetninger, ble evaluert med vekt fra en til ti, mens de resterende CMR-stoffene fikk vekt en. For de miljøfarlige stoffene med langtidsvirkning inneholder ikke risikosetningene informasjon egnet til å vurdere fare. For denne fareklassen ble stoffer som er persistente (P), bioakkumulerende (B) eller toksiske (T) (såkalte PBT-stoffer) gitt vekter fra en til ti, mens de resterende miljøfarlige stoffene med langtidsvirkning fikk vekt en.

Farevektingen er en første tilnærming til å vurdere ulik farlighet innad i de fire fareklassene. Resultatene må derfor foreløpig tolkes med forsiktighet.

Farevektingen resulterte i trender som var svært ulike utslippstrendene. Med farevekt ti viste de farevektede CMR-stoffene en jevn nedgang fra 2002 til 2007, mens farevektene for de miljøfarlige stoffene med langtidsvirkning viste en oppgang fra 2002-2005, for deretter å flate ut. Dette indikerer at det kan ha foregått et skifte fra svært skadelige til mindre skadelige stoffer innen CMR-stoffene. For de miljøfarlige stoffene med langtidsvirkning, på den annen side, ser det ut til å ha vært en økning i utslippene av PBT-stoffer.

En usikkerhetsanalyse ble gjennomført for utslippsestimatene. Usikkerhetsanalysen vurderer usikkerheter i aktivitetsdata og utslippsfaktorer. Resultatene viser at CMR-stoffene og de kronisk giftige stoffer har de klart høyeste usikkerhetene. Dette er et resultat av at en betydelig andel av utslippene i disse fareklassene skyldes forbruk ev brensler, hvor usikkerheten i utslippsfaktorene er høy. En forbedring av både aktivitetsdata og utslippsfaktorer for brensler vil derfor være det største bidraget til sikrere utslippsestimater.

Statistikken over helse- og miljøfarlige kjemikalier og denne rapporten er videreutvikling av arbeid beskrevet i Hansen (2006) og Kittilsen & Hansen (2008). Statistikken er fortsatt under utvikling, og det vil fremover være behov for stadig forbedring av både utslippsfaktorer, kvalitet og omfang av datagrunnlaget og selve beregningsmodellen.

Takk til:
Dette arbeidet har blitt gjennomført i samarbeid med Mette Follestad (Statens forurensningstilsyn- Produktregisteret). Usikkerhetsanalysen er gjennomført av Marie Lillehammer (Statistisk sentralbyrå).

Marte O. Kittilsen og Kathrine Loe Hansen har bidratt med verdifulle innspill under analyse- og skriveprosessen.

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Contents

1. Introduction

1.1. Background to the study

Cancer is responsible for one in four deaths in Norway (Statistics Norway 2007). To what extent this is caused by exposure to toxic substances is uncertain, but it is believed that the rise in incidents of at least some forms of cancer is linked to the increased use of chemicals. For instance, the occurrence of testicular and breast cancer has more than doubled since the 1950s, and the widespread use of endocrine disrupting substances is suspected to be partly to blame (St. melding nr. 14 (2006-2007)). Endocrine disrupting substances may possibly also be linked to lowered fertility and foetal damage in both humans and different animals such as polar bears, gulls and marine snails (St. melding nr. 14 (2006-2007)).

Increased awareness of the effects of toxic substances on human health and the environment has led to a growing demand for information regarding use and release patterns of these substances (NOU 2005:5). Information on a detailed level exists for many substances, but such detailed information is difficult to use for policy-making purposes.

For the past few years, Statistics Norway has been working on developing new statistics aimed at providing an overview of the consumption and emission of harmful substances in Norway (Finstad & Rypdal 2003; Hansen 2006; Kittilsen & Hansen 2008). The statistics are intended for use by governmental bodies and others as a tool for identifying important emission sources, developing abatement measures and policies for risk reduction, and for monitoring and evaluating the effect of measures taken. These new statistics have been developed in close collaboration with The Norwegian Pollution Control Authority and The Norwegian Product Register[1].

Although there is a great and growing demand for knowledge on consumption and emissions of hazardous substances, data sources are generally incomplete and difficult to combine without double counting or excluding important emission sources. Thus, producing statistics that can give a representative picture of the level and trend of emissions of hazardous substances in Norway is a considerable challenge.

At present, the statistics cover the emissions of toxic substances caused by the use of products that are subject to the duty of declaration to the Norwegian Product Register . The Product Register was chosen as a starting point for these new statistics on hazardous substances, as it is considered to be the data source that could most easily provide activity data of relatively high quality, with much appurtenant information and fairly good coverage of most product types and sectors. The current statistics include about 450 substances that are categorised as being CMR (may cause cancer, be mutagenic or generate reproductive disorders), chronically toxic, sensitising and/or having long-term detrimental effects on the environment. However, the release of hazardous substances used in the oil industry (the extraction of crude oil and natural gas) is not covered here, as we consider these to be better covered by other data sources than the Product Register.

This report contains the latest results from our work, including a first approach to additional weighing of substances based on their degree of danger.

[1] The Norwegian Register on products containing hazardous substances

1.2. Objectives of this work

The objective of this work was to produce statistics that will help governmental bodies and other interested parties in attempting to reduce the risk of damage caused by the use and emission of hazardous substances.

The statistics were to consist of consumption and emission figures for the period 2002-2007, based on data from the Norwegian Product Register. Due to the fact that not all substances within a hazard category are equally hazardous, a weighing procedure within the hazard categories “CMR substances” and “Substances dangerous for the environment” was to be performed. An uncertainty analysis was to be performed to pinpoint areas where the emission estimates were particularly uncertain, in order to examine where improvements should be made.

1.3. Structure of this report

An overview of the abbreviations used throughout this report is given in chapter 2, followed by a chapter describing the emission model (activity data and emission factors), the hazard weighing procedure and the uncertainty analysis (chapter 3). The resulting time series on use and emission patterns are presented in chapter 4. Chapter 5 presents the results of the uncertainty analysis and of the first approach to the hazard weighting. Chapter 6 focuses on areas of methodological improvement.

2. Abbreviations and definitions

ATP **A**daption to **T**echnical **P**rogress; Directive 2004/73/EC The 29th Adaption to Technical Progress of the Dangerous Substances Directive 67/548/EEC (European Commission 2004). This directive introduces the latest changes to Annex I, the list of official EU classifications of substances. It includes significant changes to the classification of some substances.

CAS number An identification number for substances described in the literature, assigned by **C**hemical **A**bstract **S**ervices, a division of the American Chemical Society (American Chemical Society 2007). Most CAS numbers refer to individual substances, but some are mixtures, such as petroleum solvents, e.g. naphtha.

CMR **C**ancer, **M**utation and **R**eproduction; group of substances that may cause cancer (be carcinogenic), provoke mutation or cause reproductive damages.

Industrial sector A combination of NACE codes and codes for private and public use provided by the Norwegian Product Register.

KemI **K**emikalie**I**nspektionen; the Swedish Chemicals Agency.

NACE International nomenclature system for industrial classification (industrial sectors). Codes according to Statistics Norway *Standard Industrial Classification* (Statistics Norway 2003), based on EU's international industrial standard NACE Rev.1.1., 2002 update. See Appendix A3.

R-phrases **R**isk **Phrases**, as defined in Annex III of European Union Directive 67/548/EEC: *Nature of special risks attributed to dangerous substances and preparations* (European Commission 1967). See Appendix A1.

Source A combination of industrial sectors and product, specifically defined for this study.

TPN **T**wo-**P**iece **N**ormal distribution, used for assessment of the distribution of the biased emission factor estimates in the uncertainty analysis.

V4OC **V**olatile **O**rganic **C**ompound (VOC) refers to any organic compound having a vapour pressure of 0.01 kPa or more at 293.15 degrees K, or having a corresponding volatility under the particular conditions of use (European Commission 1999).

UCN **U**se **C**ode **N**ordic; the Nordic Product Register's classification system for products. SeeAppendix A4.

3. Emission model

3.1. Overview

The emission calculations give estimates of the sum of emissions to air, soil, water and biota. The split between these recipients has yet to be performed. The general model is a mass balance *per substance*, where emissions are calculated by multiplying relevant activity data with an emission factor, according to the equation:

consumption = production + import - export
emission = consumption x emission factor (fraction emitted)
total emission = sum of all emissions

When used in the simplest form, all activities that can lead to or prevent emissions, i.e. waste management, are included in the one emission factor. The general model can be modified so as to integrate various pieces of information on the life cycle of different products. For some products we might have data on the fraction converted into other chemical compounds or the fraction destroyed during waste treatment. This can be expressed through variations of the simple equation, e.g.:

emission = consumption x (1 - (factor1 + factor2 + factor3)),

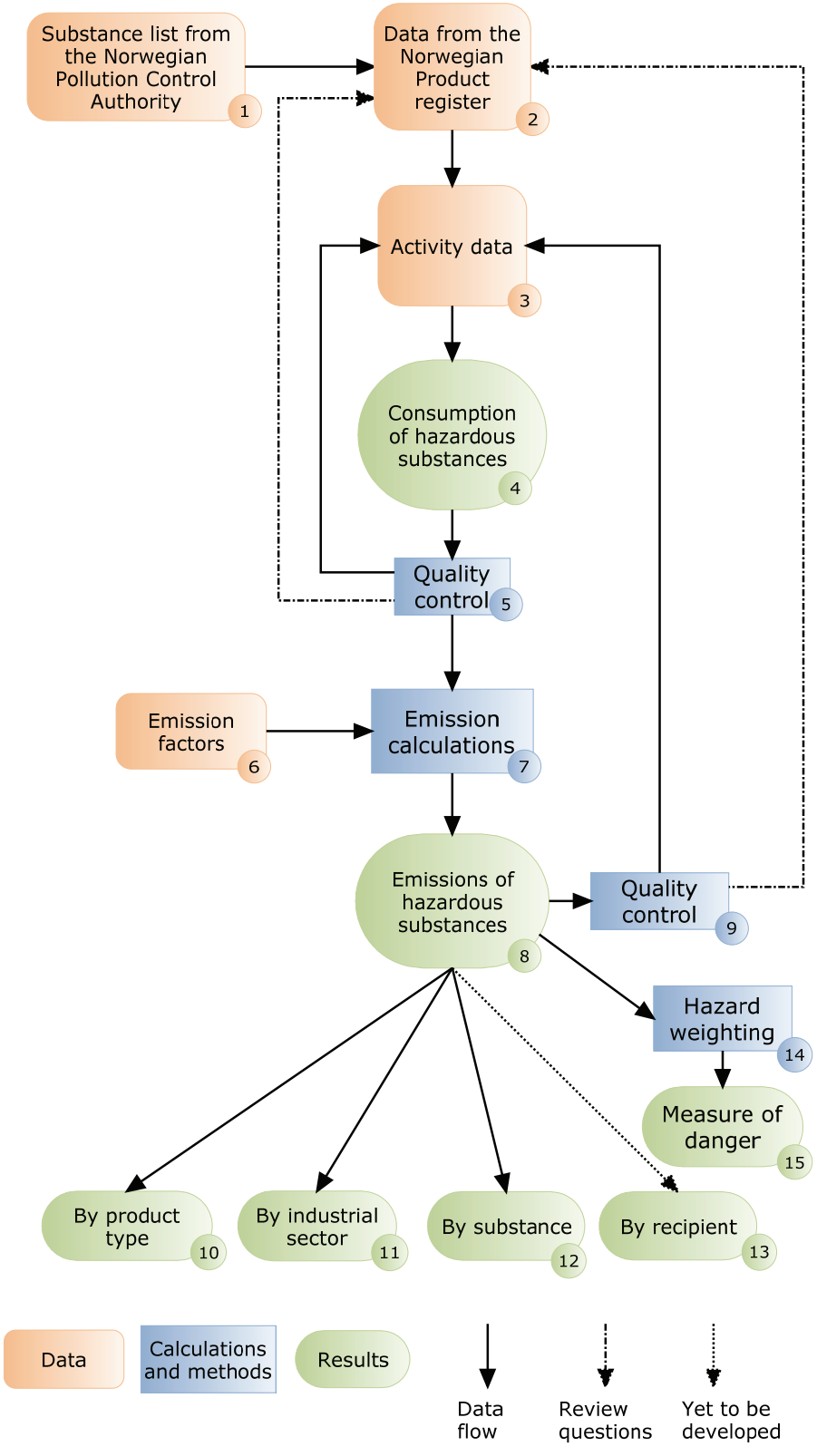
where *factor1* is the fraction converted to other chemical compounds, *factor2* is the fraction that becomes part of a new product (without being converted) and *factor3* is the fraction destroyed during waste management.

Some emissions generated by the use of declared products may be delayed, relative to the time of declaration. Firstly, the data from the Product Register contain no information on whether products are used the year of registration or stored for later use (so-called hold up). Therefore it is assumed that *all products are used the same year as they are registered*. Secondly, substances are not assumed to accumulate in long-lived products. In other words, it is assumed that *all emissions generated by the use of a given product during its lifetime take place in the same year as the product is declared* to the Product Register. In sum, this leads to emission estimates that do not fully reflect the actual emissions taking place in a given year. Emissions that in real life are spread out over several years all appear in the emission estimate for the year of registration. However, this systematic overestimation for a given year probably more or less compensates for emissions due to previously accumulated amounts not being included in the estimate figures.

A general overview of the statistics production for hazardous substances is given in Figure 3.1.

Despite data and model limitations, it is believed that the resulting emission estimates are a relatively good indicator of the trend in the emissions of hazardous substances caused by products use.

Figure 3.1. Overview of calculation procedure for emissions of hazardous substances. Numbers indicate the stage in procedure.



3.2. Substances

3.2.1. Substance coverage (Figure 1, stage 1)

This study aims to describe use and emissions of substances that are classified as being CMR (may cause cancer, be mutagenic or generate reproductive disorders), chronically toxic, sensitising and/or dangerous for the environment, according to the Norwegian List of Dangerous Substances ("Stofflisten"; FOR 2002-07-16 nr 1139, appendix VI).

The Norwegian List of Dangerous Substances is a result of Norway's legal implementation of the Annex 1 to Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances. The list is updated through the 29th Adaptation to Technical Progress (ATP) (European Commission 2004) and currently contains about 3 000 substances with corresponding risk phrases (R-phrases, listed in Appendix A1). Some substances are evaluated according to the 30th and 31st ATP, though these are not formally adopted yet. A total of 2 734 of the substances on this list were identified as having one or more of the properties mentioned above.

As a presentation of emission figures for each substance or each R-phrase was considered to be over-complex and impossible to give without violating confidentiality rules, different R-phrases were grouped into four so-called hazard categories. Tabel 3.1 shows the R-phrases that correspond to each hazard category chosen for this study. The present hazard categories correspond to the categories used in Finstad & Rypdal (2003).

Table 3.1. Hazard categories and corresponding R-phrases

Hazard category	R-phrases
CMR	R40, R45, R46, R49, R60, R61, R62, R63, R68
Chronically toxic	R48 (all combinations of R48)
Sensitising	R42, R43, R42/43
Dangerous for the environment[1]	R53, R50/53, R51/53, R52/53

[1] Currently includes substances specifically dangerous for animals in the aquatic environment. Other detrimental effects on animals (aquatic or terrestrial), such as reproductive disruption, may be partly covered by the other hazard categories.

In addition, all substances on the government's Priority List (St. melding nr. 14 (2006-2007), St. melding nr. 26 (2006-2007)) were included. This list is comprised of around 30 substances and groups of substances of special concern. The Norwegian government aims to eliminate or substantially reduce emissions of the substances on the list.

Of the 2 734 substances selected, only around 450 substances were registered in the main data source and thus included in this study. A list of these substances is given in Appendix A2. Table 3.2 shows the number of substances covered by this study included each year. The sum over categories is higher than the total, since a substance with more than one hazardous effect will be included in several hazard categories.

Table 3.2. Number of substances found in the Product Register pertaining to each hazard category 2002-2007

Hazard category	2002	2003	2004	2005	2006	2007
Total[1]	427	420	416	466	454	462
CMR	145	140	142	157	152	150
Chronically toxic	46	44	45	52	52	51
Sensitising	158	166	159	170	166	171
Dangerous for the environment	278	273	266	313	302	308

[1] Excluding substances with classification notes, cf. section 3.2.2. below.

It is important to note that for any given substance, the same classification is used for all years. If the classification has changed during the estimation period, the

current classification is used for all years. This is done in order to produce consistent time series.

3.2.2. Excluded substances

Some compounds are mixtures rather than pure substances and cannot be given an unequivocal CMR classification. This applies to many complex petroleum compounds, as well as four other relevant substances[2]. The properties of these compounds depend on the content of one (or more) hazardous substance(s). Such compounds are only considered as carcinogenic (may cause cancer) if the content of carcinogenic substances exceed the limit set in the List of Dangerous Substances ("Stofflisten"). Butane (CAS number 106-97-8) will for instance be classified as a CMR-substance if the content of butadiene is equal to or higher than 0.1 per cent.

Since data from the Product Register do not contain information on the concentration of carcinogenic substances in these compounds, they have been excluded from the emission estimates. The exclusions apply to compounds marked with the letters H, J, K, L and M in the List of Dangerous Substances ("Stofflisten") (cf. section 3.2.1). These notes are related to the carcinogenic properties of the substances. For technical reasons, the exclusions also exclude one substance (n-hexane) from the other hazard categories. However, only negligible volumes are affected (cf. section 4.6).

Table 3.3. Number of substances with classification notes found in the Product Register and excluded from the emissions estimates, 2002-2007

	2002	2003	2004	2005	2006	2007
Substances with classification notes	80	92	92	85	87	90

3.3. Activity data

3.3.1. Product Register data (Figure 1, stage 2)

The Norwegian Product Register was chosen as the primary data source. The Product Register is the Norwegian government's central register on chemical products that are subject to duty of declaration[3] and labelling, such as paint, adhesives and cleaning products (Kraft & Follestad 2007). The Product register was considered to be a data source that could easily provide activity data of relatively high quality, with much appurtenant information and fairly good coverage of emission sources. Only a few other countries have similar registers for chemical products places on the market. This means that there is little grounds for international comparison of the statistics.

The Product Control Act (Produktkontrolloven 1976), the Working Environment Act (Arbeidsmiljøloven 2005) and the Fire Prevention Act (Brann- og eksplosjonsvernloven 2002) form the basis for the central regulations on classification and labelling of dangerous chemicals. Additional rules for declarations to the Norwegian Product Register are stipulated in the act on Declaration and labelling of microbiological products. Any person placing dangerous chemicals on the Norwegian market for professional or private use has duties pursuant to these regulations. The duty of declaration applies annually to import, export and manufacturing. The only exception is when the amount of a given product placed on the market by a given importer/producer is less than 100 kg per year.

Around 15 000 declarations of hazardous products are updated annually (Kraft & Follestad 2007). One declaration can include several products with the same content but different uses. Furthermore, the same product may be declared more

[2] 1-3 butadiene in butane (CAS 106-97-8) and isobutane (CAS 75-28-5), n-hexane in hexane (CAS 110-54-3), acrylamide in methyl acrylamidoglycolate (CAS 77402-05-2) and methyl acrylamidomethoxyacetate (CAS 77402-03-0).

[3] Cosmetics and health care products are examples of products not subject to the duty of declaration.

than once if imported by several importers (rarely more than three). Thus, 15 000 declarations correspond to about 40 000 products being declared. A total of 3 000-4 000 declarations are omitted each year, as products leave the market. Nevertheless, the total number of declarations increases by about 500 every year, indicating an increasing number of products on the market and/or reflecting changes in the regulations.

In addition, some declarations are submitted to the Product Register even though the products are not under the duty of declaration. In order to avoid random effects known to be related to voluntary declarations, most of these declarations, representing approximately 10 000 products, were excluded from this study. The only exception is a small number of voluntary declarations in 2002-2004 of two biocide products that became subject to the duty of declaration by the end of 2004. Hazardous substances used in the oil industry (the extraction of crude oil and natural gas) were also omitted, as we consider these to be better covered by other data sources than the Product Register.

When a product is declared to the Product Register, a series of information about the registrant and the product must be reported. Most importantly, the chemical composition and the appurtenant volume of individual components are disclosed to the Product Register. Statistics Norway is authorised to use the net quantity of import, export and manufacture of individual components, given by CAS number (classification by Chemical Abstract Services).

The appurtenant information includes:

- Intended use/ type of product, given by a code for product type (UCN; (Product Register 2007))
- Area of use, given by industrial sector to which the product is sold (following standard industrial classification – NACE; (Statistics Norway 2003)), including private households (using specific Product Register codes; (Product Register 2007))
- Number of declarations

The information pertained in the data from the Product Register makes it possible to present results on a substance level, distributed over product types, sectors or a combination of both. As a consequence, the identification of specific substances, products or sectors that have a major influence on the emissions is greatly facilitated.

NACE codes and UCN codes are listed in Appendix A3 and A4, respectively.

3.3.2. Modelled distribution 2002-2004

The duty of declaration that forms the basis for data in the Product Register was first passed in 1981 and has since then been extended to include more effects and products several times. The coverage and data quality of the Product Register has changed dramatically. From 2005 and onwards, quantities of a given substance in a given year can be extracted from the register for combinations of products and sectors (m_{sp}). However, for the period 2000-2004, quantities can only be given as the sum over all sectors for a given substance in a given product type used in a given year ($m_{.p}$) or as the sum over all products for a given substance used in a given sector in a given year ($m_{s.}$), due to the nature of the registrations. The fraction of a toxic substance emitted is assumed to be dependent both on the type of product used and the industrial sector in which it is used. Thus, in order to assign the most appropriate emission factors, data should be distributed over combinations of products and sectors.

Owing to these properties of the Product Register data, the distribution of quantities to combinations of product type and industrial sector had to be modelled for the 2002-2004 part of the times series. In order to allocate substance quantities

to the different combinations of product and sector, information on the distributions in 2005-2006 were used. For a detailed description of the modelling process, see Kittilsen and Hansen (2008), appendix E.

3.3.3. Possible sources for error relating to the activity data

The following can potentially be the source of over- or underestimation of use and/or emissions based on Product Register data:

Products not being subject to the duty of declaration

Not all products containing hazardous substances are subject to the duty of declaration, although they may contain substantial amounts of substances classified as being CMR, chronically toxic, sensitising and/or dangerous for the environment, i.e. clothing treated with water repellents or flame retardants. Data sources other than the Product Register must be used in order to obtain estimates on emissions caused by the use of such products (cf. chapter 6).

Products subject to the duty of declaration not being declared

Not all products subject to the duty of declaration are declared. Importers/producers may be unaware of the regulation or may deliberately avoid mandatory declaration. This entails underestimation of emissions. Sample surveys carried out by the Norwegian Pollution Control Authority have indicated that as much as 25 per cent of products subject to the duty of declaration are not declared. However, the potential error is considered to be relatively small, as it is likely that this problem mainly concerns products with small consumption volumes (Kraft and Follestad *pers. com.*).

Changes in the duty of declaration

Changes in the regulations for classification and labelling will lead to changes in the coverage of the Product Register. For instance, the duty to declare environmentally hazardous products was introduced in 2002, while biocides were included by the end of 2004. If a change in the duty of declaration is suspected to produce a false emission trend, the activity data may be adjusted, in order to reflect the true emission development.

Double counting

Double counting of quantities can occur when declared substances are used to make products that are also declared to the Product Register. This source of error is handled by identifying the combinations of product type and industrial sector that most likely represent use of the substances as raw materials and applying the appurtenant emission factors (cf. section 3.4). However, some of these cases might go undetected, resulting in an overestimation of emissions.

Errors in quantity figures

Several internal checks are performed in order to identify and correct potential errors in the quantity figures extracted from the Product Register (cf. section 3.3.4).

Incomplete or erroneous sector distribution

According to prevailing rules, only 80 per cent of the quantity declared has to be assigned to an industrial sector. Any remaining quantity is registered without information on sector distribution, leading to an underestimation of emissions from the sector in which this quantity is used. The remaining quantity will be assigned sector "unknown". When a product is registered with several product codes in the same declaration, the quantity is evenly distributed to each of the registered industrial categories to which the product has been sold. This may not reflect the true distribution of the products among sectors. These sources of error in the sector distribution of the data are considered to be negligible, as most products are sold to only one sector (Kraft and Follestad *pers. com.*).

Missing product type codes

Some declarations are missing codes for product type. This might lead to an overestimation of consumption of some products and underestimation for others.

Quantities given in intervals (simplified declarations)

For some so-called simplified declarations, substance quantities are given in intervals. The maximum quantity is used for these substances, as it is assumed that there is a higher probability that the true quantity will be close to the maximum value than to the minimum value. Internal checks are performed in order to identify

intervals where the quantity figure used is substantially higher than the lower limit of the interval, in order to prevent overestimation (cf. section 3.3.4).

Negative figures

When declared quantities imported or produced one year are declared as exported the next, net quantities for the latter year are negative. This is currently handled by setting these figures to zero, resulting in an overestimation of intra-country emissions.

Errors in the modelled distributions

Although the modelled quantity distributions seemed to converge well for most substances, the modelled distributions will never be identical to the unknown, true distributions. Furthermore, some adjustments to the distributions had to be made manually for substances that did not converge. In these cases, the correct distribution could not always be identified when comparing the modelled distribution to the marginal sums.

3.3.4. Quality Control (QC) (Figure 1, stages 5 and 9)

The current QC procedures conducted by Statistics Norway include the following:

Internal checks for data consistency

- Large between-year discrepancies in the time series of substance quantities are routinely identified and investigated, in order to correct errors in consumption figures
- Large within-year discrepancies between minimum and maximum quantities in simplified declarations are routinely identified and investigated, in order to prevent overestimation for substances where consumption figures are given in intervals. For the years 2005-2007 the potential overestimation of emission figures generated by the use of maximum quantities were estimated. When using the mean of the interval values in stead of the maximum, total emissions were reduced by 2.4 per cent in 2005, 1.7 per cent in 2006 and 1.5 per cent in 2007.
- Large within-year discrepancies between totals for industrial sectors (NACE) and totals for products (UCN) are routinely identified and investigated, in order to detect erroneous or incomplete sectoral and product type distribution.

No corrections made on individual data sets are reported back to the Norwegian Product Register.

Convergence check of the modelled quantity distribution

Convergence of the modelled quantity distribution has been checked by comparing marginal sums of the modelled distributions to the true marginal sums, cf. section 3.3.2.

Check for possible effects of changes in the duty of declaration

The trend in declared volume of substances that are assumed to be affected by changes in the duty of declaration to the Product Register is analysed subsequent to substantial changes in the regulations. This is done in order to remove false emission trends.

Currently, the data have been analysed with respect to possible effects of the inclusion of environmentally hazardous products and biocides in the duty of declaration. In one substance-, product- and sector-specific case, adjustments were made by including a small number of voluntary declarations of biocides for the first part of the time series (2002-2004). No other adjustments were deemed necessary. Firstly, most of the volume of products that are now declared as biocides was declared under other product type codes prior to the inclusion of biocides in the duty of declaration. Secondly, while the inclusion of environmentally hazardous products increased the number of declarations of such products considerably (sevenfold from 2001 to 2006), the declared volume did not increase substantially (Kraft & Follestad 2007). The reason seems to be that the largest volumes of environmentally hazardous products contain substances with classification (R-phrases) belonging to one or more of the other three hazard categories and were thus already subject to the duty of declaration in 2002.

Comparison with other emission estimates using equivalent activity data

Time-series for some substances on the Priority List have been compared to data used for other emission calculations performed by the Norwegian Pollution Control Authority. Some discrepancies were found, leading to corrections of both activity data sets.

3.3.5. Confidentiality

According to § 2-6 of the Statistics Act (Statistics Act 1989), figures shall not be published in such a way that they can be traced to a particular respondent. Under Statistics Norway's rules regarding confidentiality, in order for the statistics to be publishable, aggregated data must consist of at least three observations. In this study one observation corresponds to one declaration. Aggregated data used in result tables have been checked against the true marginal sums of the number of declarations, to make sure that no confidential information is published. For the period with modelled distribution of quantities, all substance, product and sector combinations have been conservatively assumed to correspond to one declaration.

3.4. Emission factors (Figure 1, stage 6)

In order to combine emission factors from different data sources, the substances for which the emission factors are applied are currently divided in two: volatile organic compounds (VOC) and other substances not covered by the VOC definition.

There are four groups of emission factors, reflecting decreasing level of knowledge and hence increasing level of uncertainty:

1. Factors specific for combinations of substance (CAS), product type (UCN) and industrial sector (NACE)
2. Factors specific for combinations of product type and industrial sector
3. Factors specific for product type
4. General emission factor

The first group consists of factors applying to a few substances that are used in high quantities. They have been given emission factors specified for combinations of product type and industrial sector after consulting the industry. Currently these substances are all non-VOC.

The second group of factors, specified for combinations of product type and industrial sector, apply mainly to VOC. The source of the emission factor values for volatile organic compounds is the Swedish model for estimating VOC emissions from solvent and other product use (Skårman *et al.* 2006). During several studies, Sweden has developed emission factors that take into account different application techniques, abating measures and alternative pathways of release (e.g. waste or water). These country-specific emission factors apply to 12 different industries or activities that correspond to sub-divisions of the four major emission source categories for solvents used in international reporting of air pollution (European Environment Agency 2007).

It is assumed that the factors developed for Sweden are representative for Norwegian conditions, as we at present have no reasons to believe that product types, patterns of use or abatement measures differ significantly between the two countries. However, a few adjustments had to be made, the most important concerning substances used as raw materials. For each emission source category, two emission factors are applied, one for VOC used as raw materials and one for other uses. Emission factors for raw materials are generally low, since most of the substance will be converted or end up in the product with only small emissions during this process. Products with a high content of the hazardous substance will themselves be declared to the product register, thus being included in the activity data and in most cases being assigned a higher emission factor.

However, there are two problems concerning the identification of raw material:

i. Some products are declared with a product code for raw material, although they are not used as raw material. This problem is solved by combining the product type codes for raw materials with a list of VOC that are considered "true" raw materials (Fischer *et al.* 2005). Hence, the emission factors for raw materials are only applied to products declared as raw materials when in combination with these substances.
ii. Some products that are used as raw materials are declared as other product types. This second problem was solved by applying the emission factor for raw materials to other product types assumed to be used as raw materials in the industrial sectors "Manufacture of chemicals and chemical products" (NACE 24) and "Manufacture of rubber and plastic products" (NACE 25).

For several product and sector combinations, emission factors for VOC change over time. However, all emission factors have been constant since 2003.

The third group of emission factors consists of product-specific factors, applied to substances other than VOC. The source of these factors is the Swedish "Exponeringsindex" developed by KemI (Fischer *et al.* 2005) and adapted to the Norwegian estimation model in 2006 (Hansen 2006). Following these studies, products are assigned one of three emission factor values, depending on whether the emissions are expected to be high (1.0), medium (0.5) or low (0.1). Emission factors for raw materials were used only for substances identified as "true" raw materials in combination with a product code for raw materials, following the same line of argument as for the volatile organic compounds. For a list of substances defined as "true" raw material, refer to Appendix A5.

Consumption figures that have been assigned sector or product type "unknown" are given a general emission factor of 1.0 (i.e., the maximum value as a worst-case scenario). For the time-series 2002-2004, these figures sum up to less than 30 tonnes of declared substances in total.

For a summary of the emission factors, see Appendix A6.

3.5. Source allocation

In order to give an informative presentation of the results as possible, the emission figures have been summed across specific groups of industrial sectors (NACE) and product types (UCN). Energy goods (UCN B55-B60) are treated separately, as they constitute a major part of both consumption and emission figures. Emissions caused by the use of the remaining product types have been divided into manufacturing industries and other industrial sectors. Emissions in the latter source category are then further explored by division into several subgroups. Table 3.4 gives the industrial sectors allocated to the different source categories used to present the results from this study.
Note that drilling chemicals, including crude oil and natural gas (UCN O05), and products consumed in NACE 11 (extraction of crude oil and natural gas) are not included. NACE codes and UCN codes are listed in appendices A3 and A4.

Table 3.4. Source categories[1] – industrial sectors

Source	Industry (NACE)
Manufacturing industries	15-37
Primary-, construction- and transport sectors and private households (Industrial sectors other than manufacturing industries)	
- Primary sector (agriculture, forestry and fishing)	01-05
- Construction	45
- Transport	60-63
- Other service industries	50-55, 64-99
- Private households	Private households[2]

[1] NACE 11 and UCN O05 are not included in the analysis
[2] Specific codes used by the Product Register

3.6. Completeness

The model estimates emissions of selected hazardous substances (cf. appendix A2) generated by the use of products that are subject to the duty of declaration in all industrial sectors as well as private households. Manufacture where the selected substances are used as raw materials are included. However, emissions during primary production of the hazardous substances are not included in this model, as these are not covered by the Product Register data.

Some manufacture using hazardous substances as raw materials may produce products that are not subject to the duty of declaration. In such cases emissions from the resulting products can be included by increasing the emission factor used on the manufacturing process.

3.7. Technical solution

The process of estimating emissions of hazardous substances employs both Excel and the SAS system (SAS Institute Inc. 1999) software. Data from the Product Register are provided once a year as flat files that are converted directly into a SAS data matrix. The emission factor matrix and the source allocation matrix are revised in Excel and transferred to SAS. Generation of the complete activity dataset, data revision, emission estimation and source allocation and production of result tables are all done using SAS.

3.8. Uncertainties

An analysis of uncertainties for the years 2005-2007 was performed in this study. The objectives of the uncertainty analysis were to estimate the uncertainty of the emission level and trend, and to pinpoint the areas where a decrease in the uncertainty of emission factors and activity data would be most improve the quality of the overall emission estimates. Both errors in activity data and emission factors contribute to uncertainty in the estimates. For a detailed description of the methodology in the uncertainty analysis, see Lillehammer (2009).

3.8.1. Uncertainty in emission factors

The emission factors are gathered from several different sources, with different levels of accuracy. The uncertainties in emission factors depend on how detailed assessment has been made when the emission factor was set. Some emission factors are assumed to be unbiased, while others are set close to the expected maximum of the range of probable emission factors. This, together with the fact that the parameter range is limited, gives us a non-symmetrical confidence interval around some of the emission factors. For each emission factor we thus have two standard deviations; one negative (σ_1) and one positive (σ_2). These are aggregated separately, and the aggregated uncertainty is thus not necessarily symmetrical.

Setting some emission factors close to the expected maximum of the range of emission factors can be justified due to the nature of the statistics; it is to be desired to make a correct estimate of the emissions, but if one is to be wrong, it is considered better to be overestimating than to be underestimating the emissions.

The uncertainties in emission factors are grouped and evaluated based on their level of detail (i.e. the source of each emission factor, see section 3.4), where group 1 is the most detailed and certain, and group 4 is the most general and thus most uncertain (Table 3.5).

Table 3.5. Uncertainty in emission factors within each group

Group	Emission factor	Standard deviations (σ_1/ σ_2)	Basis
1	≤ 0.001	Emission factor*0.5/0.0005	These emission factors have been documented to be very low. The confidence interval has been truncated in order not to obtain negative values.
	”Rounded” up	1.5*rounding/0.5*rounding	The “rounding” is to reflect that the emission factor is imprecise[1]. We assume that the rounding amounts to one standard error, and that the original estimate is unbiased.
	Interval	Lower boundary-estimate*0.5/ upper boundary-estimate*0.5	When the emission factor originally is given as an interval, this interval is assumed to be a 95 per cent confidence interval.
	Stated number 0.06	0.0025/0.0025	The estimate is assumed to be rounded off to the nearest 0.01; consequently it should be between 0.055 and 0.065.
	Stated number 0.1	0.025/0.025	The estimate is assumed to be rounded off to the nearest 0.1; consequently it should be between 0.05 and 0.15.
	1	0.0005/0	It is thoroughly documented that everything or nearly everything is emitted. A small, negative uncertainty is nevertheless assumed.
2	All	Emission factor*0.1/ Emission factor*0.1	The source for these emission factors (Skårman et al 2006) states an uncertainty of 20 per cent. The confidence intervals are truncated where they would exceed the limit value 1.
3	0.0001	0.00005/0.0005	This category is used for substances assumed to be raw materials, where the product enters into another product and only small amounts are emitted. The same uncertainty as for very low emission factors in category 1 is used.
	0.0025	0.00125/0.00125	Emission factor for combustibles with no emission statistics. Results from combustibles with emission statistics have emission factors between 0.000005 and 0.005. The uncertainty is set in such a way that the entire interval is covered.
	0.1	0.05/0.05	This factor is a quantification of the statement “low emissions”, and this is the lowest possible factor for some products. It is thus reasonable to let the confidence interval possibly reach zero by setting the uncertainty equal to the emission factor.
	0.5	0.15/0.15	This factor is a quantification of the statement “medium emissions”. The assumed uncertainty gives a 95 per cent confidence interval of [0.2, 0.8] if one assumes that the values stem from a normal distribution. It will also be close to the uncertainty if the distribution is assumed to be uniform between 0.2 and 0.8.
	1	0.14/0	This factor is a quantification of the statement “high emissions”, and the data are assumed to stem from a mixed distribution. A proportion of the products has a true emission factor of 1, while the rest have a true emission factor above 0.8. A proportion of the data points will then have an uncertainty ≈ 0, while the others will have an uncertainty ≈ 0.2 (n). With an additional assumption that about one third of the observations have emission factor 1 gives an uncertainty (n) of 0.14 (σ_1= 0.07).
4	1	0.5/0	This emission factor is used when there is no available information about the emissions. The emission factor is assumed to possible attain any value between 0 and 1, and the uncertainty (n) is thus 1 (σ_1= 0.5).

[1]When the industry has stated an emission factor with more decimals than is assumed to reflect the true uncertainty, the emission factor is rounded off before the emission calculations. After the rounding off, the number of decimals should be in correspondence with the uncertainty in the emission factor.

3.8.2. Uncertainty in activity data

Uncertainties in the activity data are related to erroneous composition of products, substances declared to the wrong NACE and erroneous quanta of substances. The errors in activity data are not directly quantifiable. Any under-coverage in the Product Register is not taken into account. Skårman *et al.* (2006) found that the activity data from the Swedish Product register had an uncertainty of about 15 per

cent. The Norwegian Product Register is deemed to be comparable to the Swedish, and thus the uncertainty in the activity data is set to be 15 per cent.
For some products, simplified declarations (cf. section 3.3.3) give an indication of maximum and minimum possible amounts. In these cases, the maximum amount is used, and the positive uncertainty is set to 15 per cent as for other activity data, while the negative uncertainty is assumed to be the interval between maximum and minimum amount. All activity data are set to zero if negative, and this may cause an additional bias not included in this analysis.

3.8.3. Aggregated uncertainty of level

The parameters in the distributions of the activity data ($\hat{A}_i$) and emission factors ($\hat{f}_i$) are used to calculate expectation and variance in emissions ($\hat{U}_i$). This can further be used to estimate uncertainty at any chosen aggregation level.

The estimated variance is given by

$$\hat{Var}\left(\hat{U}_i\right) = Var\left(X_i\right)Var\left(Y_i\right) + \hat{f}_i^2 Var\left(Y_i\right) + \hat{A}_i^2 Var\left(X_i\right)$$

Due to the fact that not all emission factors are unbiased estimates, they are assumed to follow a two-piece normal distribution (TPN).

3.8.4. Aggregated uncertainty of trend

There is little variation in the emission factors between years. From 2005-2007, there are no changes in emission factors. Variation in emissions is thus a result of changes in activity data within each combination of sector and product type. The uncertainty of the difference between years is then connected to the uncertainty in the variance in activity:

$$Var\left(\hat{f}_i\left(\hat{A}_{i2} - \hat{A}_{i1}\right)\right) = \hat{f}_i^2\left(Var\left(\hat{A}_{i2}\right)\right) + \hat{f}_i^2\left(Var\left(\hat{A}_{i1}\right)\right),$$

where $\hat{A}_{it}$ is the activity of substances i at time t. The variance of the trend is calculated for each substance and summed in the same manner as for the uncertainty in level. The confidence interval for trend is assumed to be symmetrical around expected change, which deviates from the estimated change by (expected deviation at $t = 2$ minus expected deviation at $t = 1$).

3.8.5. Sensitivity analysis

Some combinations of substance, product type and industrial sector were identified to contribute greatly to uncertainty. A test was performed in order to estimate how much the aggregated uncertainty would change if the uncertainties in emission factor or activity data for these combinations were reduced, i.e. if more certain data could be produced.

3.8.6. Hazard weights (Figure 1, stage 14)

Not all substances within a hazard category are equally hazardous. For instance, the hazard category “CMR substances” includes substances pertaining to, among others, the risk phrase R40 (Limited evidence of carcinogenic effect) or R45 (May cause cancer). Substances with these two risk phrases will not constitute an equal level of danger or risk when emitted to the surroundings. Applying appropriate hazard weights to emission figures, e.g. assigning a somewhat higher weight to substances classified as R45 than to substances classified as R40, would diminish this problem and bring the resulting estimates closer to a measure of danger. Hazard weighing thus has the potential to increase the relevance of the statistics, as it transforms the emission estimates into information about the hazard of emissions. There have been previous attempts at hazard weighing substances based on R phrases (Fischer et al. 2005, Hansen 2006).

The results obtained from such a hazard weighing is very dependent on the values of the hazard weights, but the excersise is still an important step towards a better understanding of the potential damage caused by the use of hazardous substances. Furthermore, it highligts the fact that not using hazard weights when calculating emission sums actually implies that all substances are given the same weight - the weight of 1.

In order to estimate the effects of hazard weighing on the trends in the time series, hazard weigths ranging from one to ten has been applied in this work. First, the substances that are considered more dangerous, and thus should receive a hazard weigth higher than one, were identified (see below). These substances were subsequently weighted, and then the sum of substances weighted with one and with a higher number was calculated. Finally, the overall trend within each hazard category was evaluated. Quantifying hazard weights is a difficult task that demands specific knowledge of the damaging properties of each substance. The substances within each hazard weighing group suggested here are likely to have quite different properties, and separating into only two categories is thus just a coarse first approach to hazard weighing.

For the hazard categories “CMR substances” and “Substances dangerous for the environment” such a weighing based on the hazard of the substance is feasible. For a detailed overview of the substances that has been weighted, see Appendix A2. For chronically toxic or sensitising substances, no subdivision is proposed for this report. Hence, all substances within these hazard categories are given the weight 1. A substance pertaining to several hazard categories will be hazard weighted separately for each category, based on the classification properties of the substance (i.e. a substance might be weighted as a category A CMR substance and a category B substance within the hazard category “dangerous for the environment”).

Applying hazard weights to some substances within a hazard category results in an augmentation of these substances. Erroneous declarations previously not dominant enough to be intercepted by the QC may become very dominant when hazard weights are applied. The results should thus be interpreted with caution.

CMR substances

The hazard category “CMR substances” has in this study been subdivided into two groups, based on their R-phrases. The CMR substances are in the European regulations on classification, packaging and labelling of dangerous substances (European Commission 2008) allocated to subgroups with letters C (carcinogenic), M (mutagenic) and R (toxic to reproduction) and numbers 1-3 based on R-phrases (European Commission 2008). The numbers represent the degree of seriousness of the hazard of the substance. C1 and C2, M1 and M2, and R1, R2 and to some extent R3, have in the European regulations generally been “grouped” as more hazardous, i.e. they are more strictly regulated in for instance REACH and certain downstream regulations. The same approach for the hazard weighting of CMR substances have been chosen here. The most hazardous of the CMR substances (C1, C2, M1, M2, R1, R2 and R3) have been assigned to weighting category A, and are evaluated with hazard weights from one to ten (Table 3.6). The remaining substances are equally weighted given the weight one, and are assigned to category B. The sizes of the hazard weights are somewhat arbitrary, and they are not quantifications of the actual hazard of each substance.

Table 3.6. Hazard weighing of CMR substances, based on R-phrases

Weighting category	CMR group	R-phrases	Hazard weight
Category A	C1 and C2	R45, R49	1-10
Category B	C3	R40	1
Category A	R1-3	R60, R61, R62, R63	1-10
Category A	M1 and M2	R46	1-10
Category B	M3	R68	1

Substances dangerous for the environment

The classification system of hazardous substances (risk phrases) could not be used to subdivide this hazard category, as it is not exhaustive. Using hazard weights

merely based on groups of existing risk phrases could, thus, be very misleading. Most importantly, substances that represent the highest environmental concern, i.e. substances that are persistent (P), bioaccumulative (B) and toxic (T) (so-called PBT-substances), do not yet have a separate classification category. For instance, perfluorooctanesulfonate (PFOS), a substance of highest concern due to its PBT-properties, is proposed classified with R51/53 (cf. Appendix A1) under the existing classification system for environmental hazard. However, PFOS is not degraded in the environment by any known mechanism; it accumulates in living organisms and is found in animals and humans in the Arctic. Following a weighting scheme using risk phrases, PFOS would be assigned a lower hazard weight relating to environmental hazard than e.g. dicopper oxide, which is classified with R 50/53, although the latter all in all is considered to be of much less concern with regard to long-term effects on the environment.

Criteria for identifying priority ecological toxins have been established by the Norwegian authorities (St. melding nr. 14 (2006-2007) ; St. melding nr. 25 (2002-2003)), and REACH (European Commission 2006) has established criteria for PBT- and vPvB (very persistent, very bioaccumulative) substances (REACH Annex XIII). REACH recital 76 states that "Experience at international level shows that substances with characteristics rendering them persistent, liable to bioaccumulate and toxic, or very persistent and very liable to bioaccumulate, present a very high concern".

Substances that are classified to be dangerous for the environment include a wider range of substances than PBT substances, as the criteria for toxicity, persistence and bioaccumulation are less rigorous than the equivalents for PBT substances. For most of the substances classified as dangerous for the environment, it will, based on risk analyses, be possible to calculate concentrations in the environment that are not suspected to cause any environmental risk (establishment of PNEC; Predicted No Effect Concentration).

Hence, the hazard category “Substances dangerous for the environment” was subdivided into two categories, based on their hazardous properties; A) PBT/vPvB substances and substances of equal concern and B) other substances classified as dangerous for the environment. The PBT/vPvB substances were extracted from the Norwegian Priority list, the Candidate list under REACH and substances identified as PBT/vPvB on the list of potential PBT under the interim stategy for REACH and the Existing substances Regulation (European Commission 2009). The PBT substances within the hazard category “Substances dangerous for the environment” were assigned to category A and evaluated with hazard weights ranging from one to ten, while the other substances dangerous for the environment were assigned to category B, and the weight was set equal to one, i.e. no sophisticated weighting was performed.

4. Results

4.1. Overall use and emission trends

Each year, around 6 million tonnes of hazardous substances covered by this study are consumed (cf. chapter 3.2.1 on coverage). Roughly 0.3 per cent of this is emitted to the surroundings. In other words, nearly 19 000 tonnes of these substances that are classified as CMR, chronically toxic, sensitising and/or dangerous for the environment find their way to the environment every year. By comparison, the ship Full City that recently caused an oil spill on the Norwegian coast in the vicinity of Langesund, carried approximately 11 000 tonnes of oil, of which a large, but yet to be determined, proportion emitted and polluted the coast line. These emissions contain a substantial share of hazardous substances.

Table 4.1 shows amounts consumed and emitted, by hazard category. In this table, a substance is included in several categories if it has more than one hazardous effect. This means that the use and emission figures should not be added across hazard categories.

Table 4.1. Consumption and emissions of substances by hazard category, 2002-2007. Kilotonnes

	2002	2003	2004	2005	2006	2007
Consumption						
CMR	5 883	6 548	7 474	5 439	5 245	6 242
Chronically toxic	264	238	219	187	206	211
Sensitising	141	144	126	154	148	153
Dangerous for the environment	587	588	418	605	657	592
Emissions						
CMR	15.3	13.9	11.7	13.9	13.1	15.4
Chronically toxic	1.1	0.8	0.8	0.8	0.9	1.0
Sensitising	3.1	3.0	3.3	3.2	3.4	3.1
Dangerous for the environment	4.8	5.3	6.2	6.7	6.0	5.6

For the CMR substances there was a peak in the consumption in 2004. This was accompanied with the lowest emissions throughout the time series. The main contributor to the high consumption of CMR containing substances in 2004 was increased use of products termed “motor fuels” in oil refineries. When used in the oil refinery industry, motor fuels are assumed to be raw material and the emissions are assumed to be very low. When motor fuels are used in other sectors, emissions are deemed to be higher, assuming that a small amount of fuel is not combusted. From 2006 to 2007 there was an increase in emissions as well as consumption for motor fuels for public use, sea and land transport.

Table 4.2 shows the volume distribution among the number of hazard categories a given substance can pertain to. The greatest amounts by far are included in only one hazard category, while a relatively small volume of a total of six substances occur in the figures for all four hazard categories. Four of these six substances are on the Priority List. These substances may be considered to be more toxic than many of the other substances, as they have a particularly wide range of R-phrases. The use of these substances is mainly confined to the manufacturing industries, where protective equipment presumably is in place. The consumption and emissions of these substances have dropped continuously since 2002.

Table 4.2. Consumption of substances with classifications pertaining to one or more hazard categories, 2002-2007. Kilotonnes

Number of hazard categories	2002	2003	2004	2005	2006	2007
1-4	5 969.6	6 643.3	7 565.8	5 527.3	5 319.2	6 321.6
1	5 068.7	5 772.0	6 897.9	4 674.8	4 388.1	5 451.6
2	897.0	868.6	664.6	847.9	927.1	866.0
3	3.5	2.6	3.3	4.5	4.0	4.0
4	0.4	0.1	0.04	0.05	0.04	0.03

Figure 4.1. Emissions of hazardous substances in 2002-2007, relative to the emission level in 2002, by hazard category and emissions per hazard category, 2002 and 2007. Index (2002=1) and tonnes

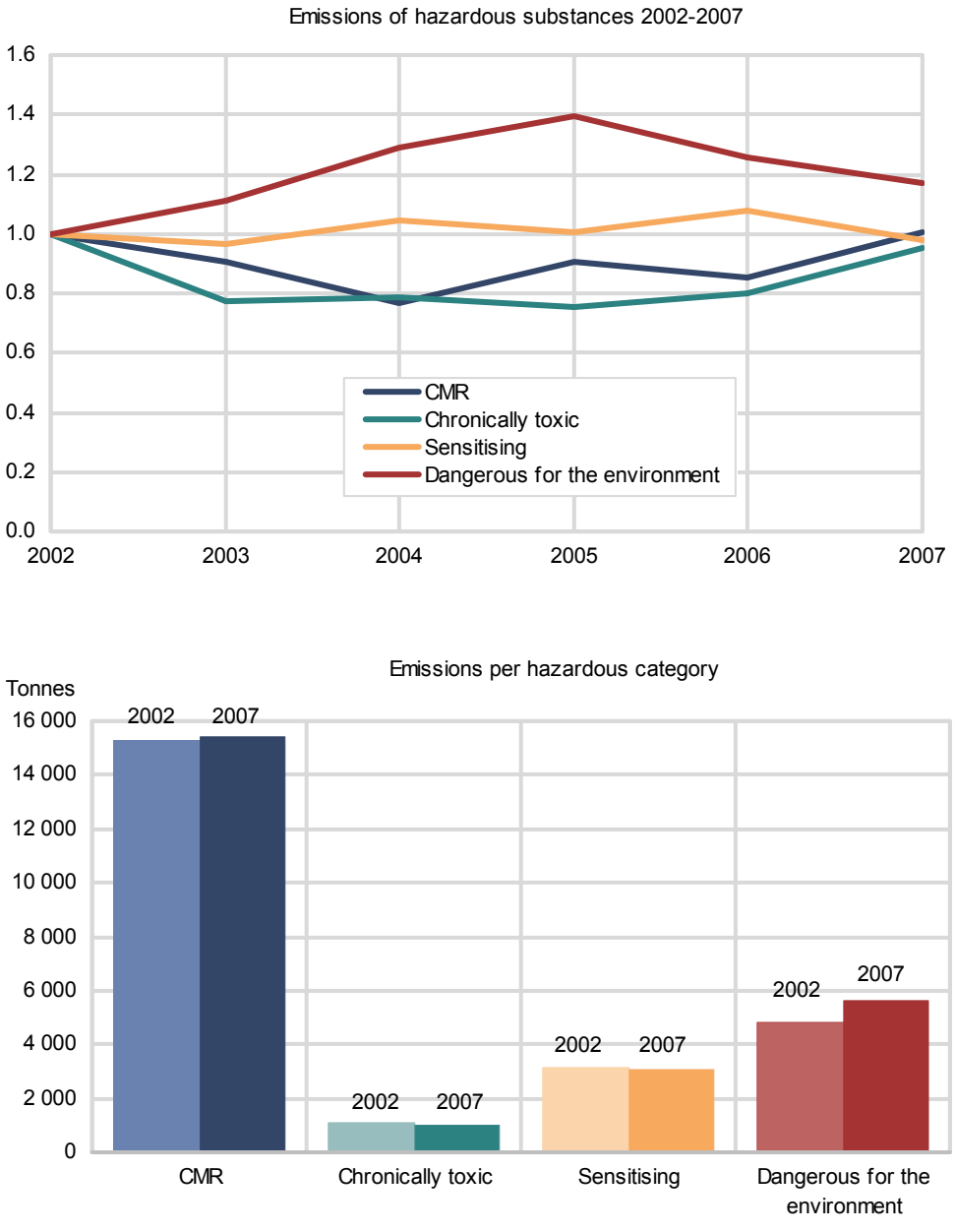


Figure 4.1 depicts the emission trends of the four hazard categories, relative to the start of the time series. The emissions of CMR substances and chronically toxic substances dropped in the beginning of the time series, but have since then increased to approximately 2002 level. Emissions of substances dangerous for the environment have had the opposite development, with an increase from 2002-2005, and a sharp decline in the past two years. The sensitising substances have had a relatively stable level of emissions over the past six years.

While the overall emission levels are comparable in 2002 and 2007 for all hazard categories, there has been much variation at the more detailed level (Table 4.3). There is substantial between-year variation in the number of substances being declared within each hazard category. Generally, for each hazard category, more substances entered than left the activity data between 2002 and 2007. In addition to the variability in number of substances included in the analysis, there is also variation in the emissions of each substance. Notably, more than twelve per cent of the CMR substances with maximum emissions above 50 tonnes had a variation of more than 50 per cent between maximum and minimum emissions (of years present). This percentage is lower for the other hazard categories, but there is still a considerable proportion of the substances showing large variation in emissions between years.

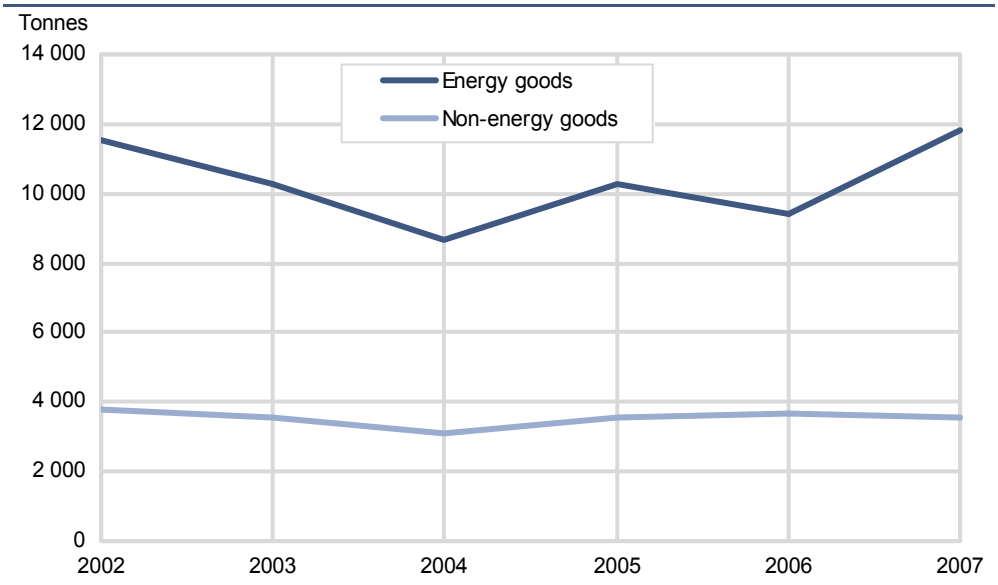
Table 4.3. Variation in number of substances present and emissions per substance, 2002- 2007. Number of substances and per cent

Hazard category	Substances present in 2002-2007.	Substances present in 2002 and not in 2007.	Substances present in 2007 and not in 2002.	Substances with a variation in emisssions larger than 50 per cent during the period and maximum emissions above 50 tonnes	
	Number	Number	Number	Number	Per cent
CMR	185	22	27	23	12.4
Chronically toxic	64	7	12	4	6.3
Sensitising	203	21	34	11	5.4
Dangerous for the environment	375	42	72	17	4.5

4.2. CMR substances

The overall development in emissions from products containing substances with CMR effects is dominated by the consumption of energy goods, such as motor and heating fuels (Figure 4.2). The emissions of CMR substances from non-energy goods have been relatively stable from 2002-2007. Emissions of CMR substances from fuels are widely dispersed, as fuels to a large extent are used by private consumers. For a detailed list of product types and substances responsible for emissions of CMR substances in 2007, see appendices B1 and B2.

Figure 4.2. Emissions of CMR substances from energy goods and non-energy goods, 2002-2007. Tonnes



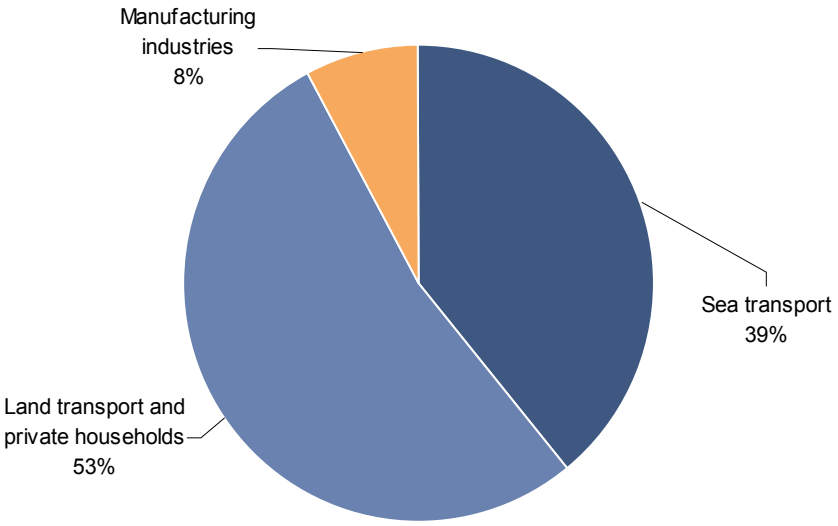
4.2.1. CMR substances in energy goods

Only a very small proportion of the fuels used are emitted, since they are filled in tanks and combusted for heating and transport purposes (cf. appendix A6). However, as millions of tonnes of these products are consumed annually, the emissions of CMR substances from energy goods are large compared to emissions

from other products. Note that emissions of CMR substances that are formed during combustion (exhaust) are not included in these figures.

Inland transport is responsible for more than half of the emissions of CMR substances from energy goods (Figure 4.3). This category includes emissions from private consumers, goods traffic and public transport, and the emissions are largely due to motor fuels. The other half of emissions of CMR substances from energy goods stem from sea transport and the manufacturing industries. In sum, the most dominant substances are diesel fuel (CAS number 68334-30-5) and fuel oil no. 2 (CAS number 68476-30-2).

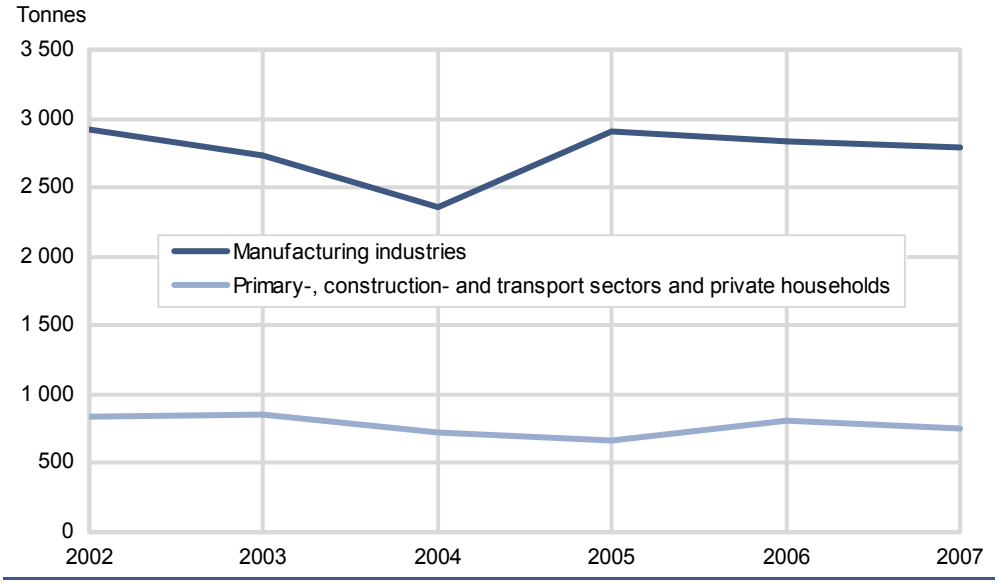
Figure 4.3. Emissions of CMR substances from energy goods by sector, 2007. Per cent



4.2.2. CMR substances in products other than energy goods

Other products than energy goods (such as biocides, electrolytes and solvents) contribute considerably to emissions of CMR substances. The manufacturing industries were in 2007 responsible for approximately ¾ of the emissions of CMR substances from products other than energy goods (Figure 4.4). The emissions from the manufacturing industries has been relatively stable during the 2002 - 2007 period, but showed a decrease from 2002-2004, with a corresponding increase in 2005. The emissions from industrial sectors other than the manufacturing industries have been relatively stable in this period.

Figure 4.4. Emissions of CMR substances from manufacturing industries and other industrial sectors, 2002-2007. Tonnes



Manufacturing industries

The total emissions of CMR substances from the manufacturing industries have been relatively constant in the 2002-2007 time period. The low emissions in 2004 were due to reduced consumption of raw materials in the chemical industry. The two most dominant product types in 2007 were biocides and raw materials (Figure 4.5). The emissions from these two product types have increased in the past few years, but this trend has been counteracted by a decrease in emissions from binding agents.

The collective term "other" in Figure 4.5 includes emissions from product types such as paint and varnish, solvents, cleaning agents and filling agents. Within the manufacturing industries, the manufacture of wood and wood products is responsible for the largest emissions (Figure 4.6), largely due to a high consumption of biocides. Within the manufacture of chemicals and chemical products, substances declared as raw materials are dominant. These substances are consumed in very large quantities, but the emissions are relatively low.

Figure 4.5. Emissions of CMR substances from products other than energy goods in the manufacturing industries, by product types, 2002-2007. Tonnes

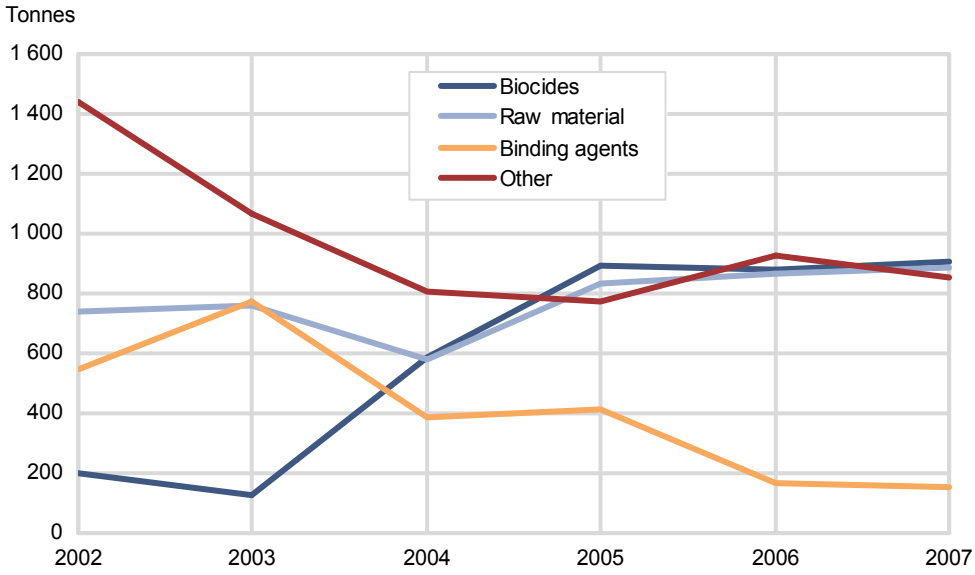
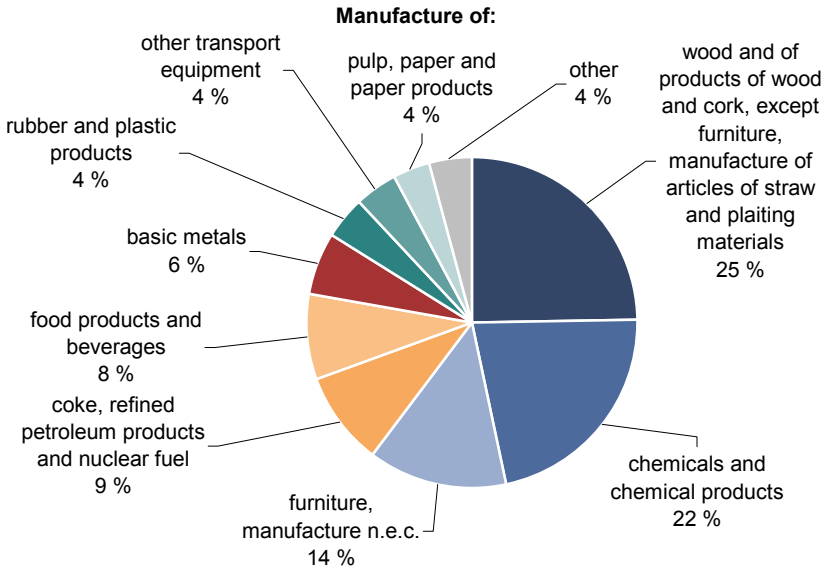


Figure 4.6. Emissions of CMR substances from products other than energy goods from industrial sectors within the manufacturing industries, 2007. Per cent



Primary-, construction- and transport sectors and private households

While the overall emission trend of CMR substances from non-energy goods in industrial sectors other than the manufacturing industries has been relatively stable in the period from 2002 to 2007, there has been a shift in what product types that dominate the emissions (Figure 4.7). Emissions from biocides have increased, while emissions from paint and varnish have decreased. This may be due to changes in the duty of declaration, as many substances previously declared to paint and varnish were declared in biocides from 2004 (see section 3.3.4). In biocides, the use of formaldehyde (CAS number 50-00-0) has been particularly high in 2006 and 2007.

For a detailed list of product types and substances contributing to emissions of CMR substances from the use of non-energy goods in the primary-, construction- and transport sectors and private households in 2007, see appendices B3 and B4.

In 2007, the construction industry and education were each responsible for approximately ¼ of the emissions of CMR substances from non-energy products in the primary-, construction- and transport sectors and private households (Figure 4.8). Notably, private households and public use (no NACE) had 13 per cent of these emissions. The CMR-containing products used in private households were paint and varnish, paint and varnish removers, adhesives, solvents, biocides and cleaning agents. The CMR substances used in these products, and contributing to the emissions, are the least dangerous CMR substances. To protect human health and the environment, the use of the most hazardous CMR substances in private household products is regulated through legislation.

Figure 4.7. Emissions of CMR substances from products other than energy goods in industrial sectors other than the manufacturing industries, 2002-2007. Tonnes

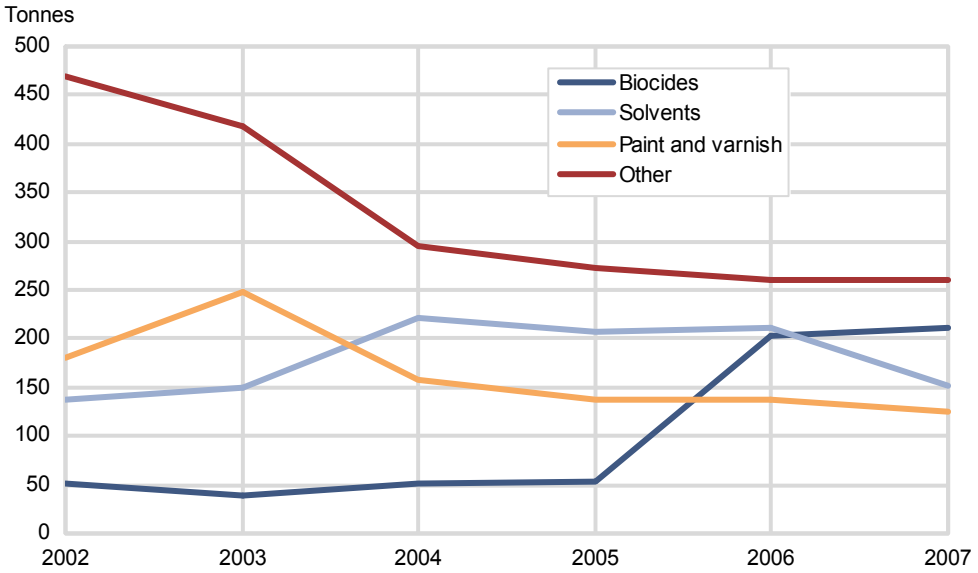
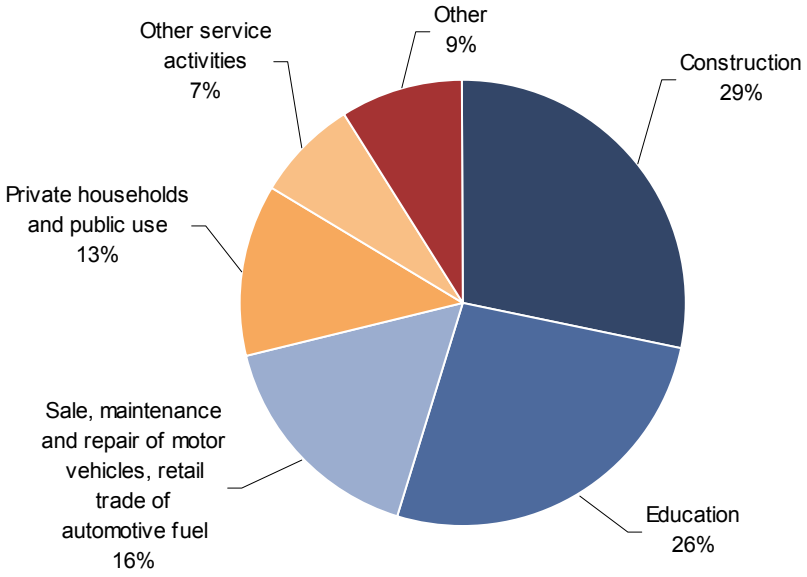


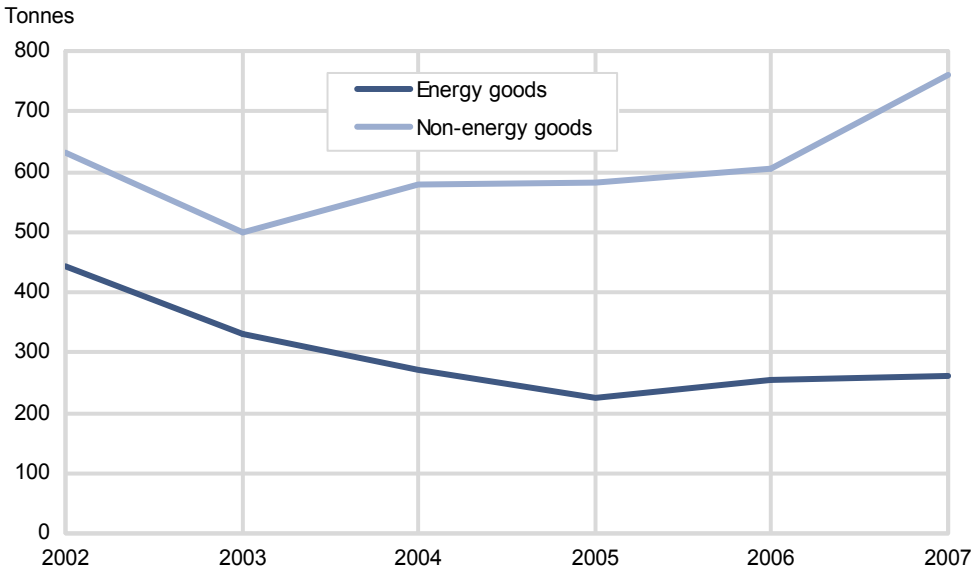
Figure 4.8. Emissions of CMR substances from products other than energy goods from industrial sectors other than the manufacturing industries, 2007. Per cent



4.3. Chronically toxic substances

The emissions of chronically toxic substances showed a decrease in the beginning of the time series, but have since 2005 increased to approximately the 2002 level. There has been a decrease in emissions of chronically toxic substances from the use of energy goods, and a steady increase in emissions from non-energy goods from 2003 (Figure 4.9). The most dominant substances within the emissions of chronically toxic substances are toluene (CAS number 108-88-3), carbon monoxide (CAS number 630-08-0) and 2,2'-iminobis-ethanol (CAS number 111-42-2). For a detailed summary of product type and substances contributing to emissions of chronically toxic substances in 2007, see appendices B1 and B2.

Figure 4.9. Emissions of chronically toxic substances from energy goods and non-energy goods, 2002-2007. Tonnes



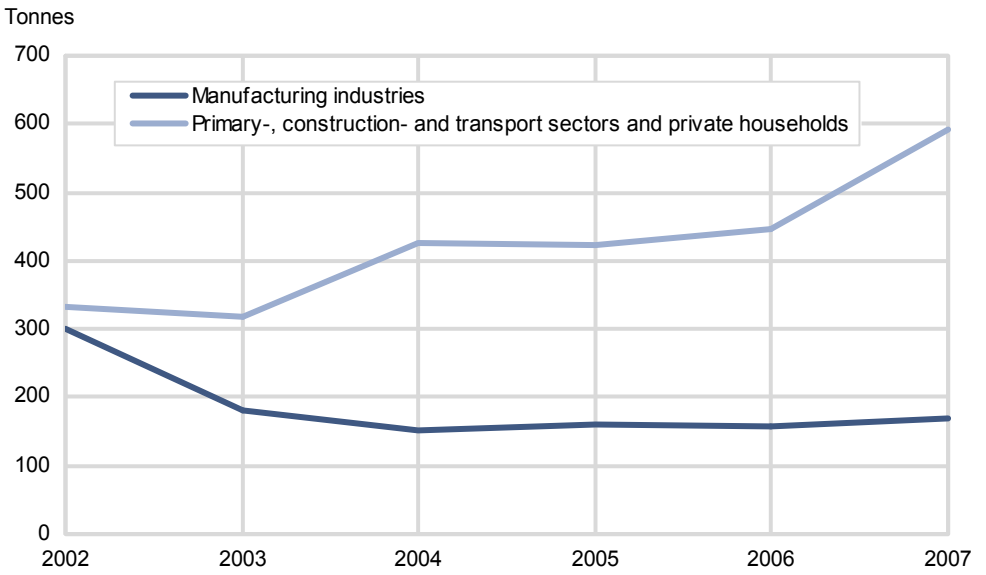
4.3.1. Chronically toxic substances in energy goods

The manufacturing industries were in 2007 responsible for 96 per cent of consumption and 93 per cent of emissions of chronically toxic substances from the use of energy goods. Due to confidentiality issues, no detailed information about substances or industrial sectors leading to emissions of chronically toxic substances from the use of energy goods can be given.

4.3.2. Chronically toxic substances in products other than energy goods

The emissions of chronically toxic substances from products other than energy goods in the manufacturing industries decreased slightly in the first two years in the time series, and have been relatively constant thereafter (Figure 4.10). In 2007, the manufacturing industries were responsible for approximately 22 per cent of the emissions of chronically toxic substances from products other than energy goods. The primary-, construction- and transport sectors and private households are thus responsible for the lion's share of emissions from non-energy products, and cause the increase in emissions from 2002 to 2007.

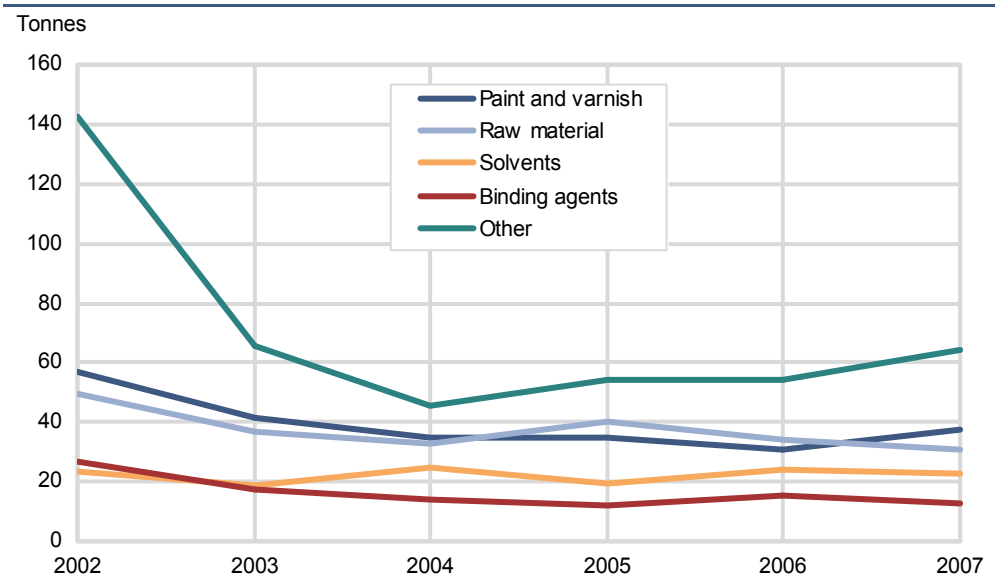
Figure 4.10. Emissions of chronically toxic substances from products other than energy goods in manufacturing industries and other industrial sectors, 2002-2007. Tonnes



Manufacturing industries

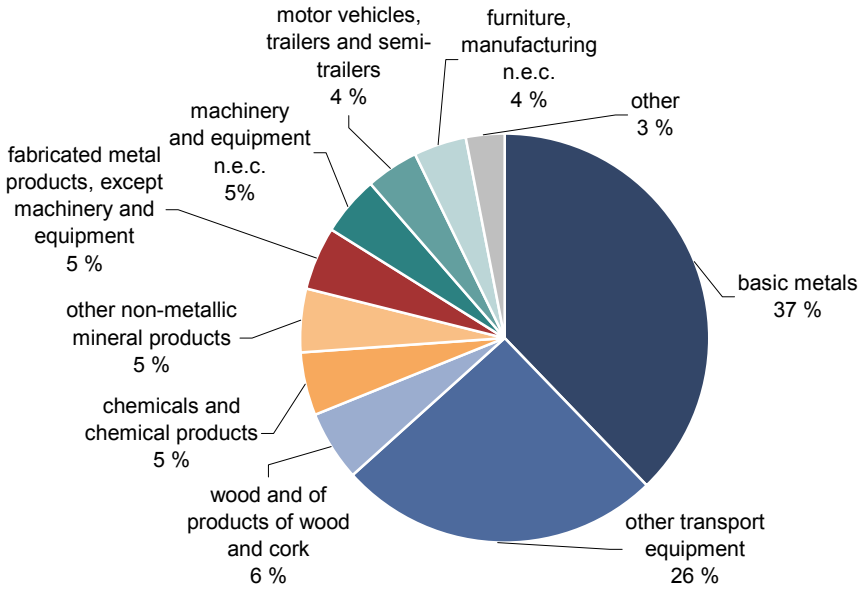
The manufacturing industries emit chronically toxic substances from the use of various raw materials, paint and varnish, solvents and binding agents, as well a long range of other product types (Figure 4.11). After a decrease in emissions from practically all product types (other than energy goods) from 2002-2004, the emissions of chronically toxic substances from the manufacturing industries have been stable.

Figure 4.11. Emissions of chronically toxic substances from products other than energy goods in the manufacturing industries, by product types, 2002-2007. Tonnes



Within the collective term "other" in Figure 4.11 there has been a substantial decrease in emissions from impregnation agents, galvano-technical agents, adhesives and electrolytes. This declining trend is partly counteracted by increased emissions from process regulators.

Figure 4.12. Emissions of chronically toxic substances from products other than energy goods, most important industrial sectors within the manufacturing industries, 2007. Per cent



The emissions of chronically toxic substances from products other than energy goods in the manufacturing industries are most predominant from the production of basic metals (37 per cent) and the manufacture of transport equipment other than motor vehicles (26 per cent) (Figure 4.12). Within the manufacture of transport equipment, the use of paint and varnish and solvents in the building and repair of ships and boats leads to considerable emissions.

Primary-, construction- and transport sectors and private households

The overall emission trend of chronically toxic substances from non-energy goods in industrial sectors other than the manufacturing industries has showed a considerable increase since 2002. The emissions from solvents increased in the beginning of the time period, but decreased from 2006 to 2007 and are now at approximately the 2002 level (Figure 4.13). This decrease has been more than counteracted by large emissions from the use of one single substance within construction. The emissions from paint and varnish and adhesives have been relatively stable in the time period.

For a detailed list of product types and substances contributing to emissions of chronically toxic substances from the use of non-energy goods in the primary-, construction- and transport sectors and private households in 2007, see appendices B3 and B4.

Figure 4.13. Emissions of chronically toxic substances from products other than energy goods in industrial sectors other than the manufacturing industries, 2002-2007. Tonnes

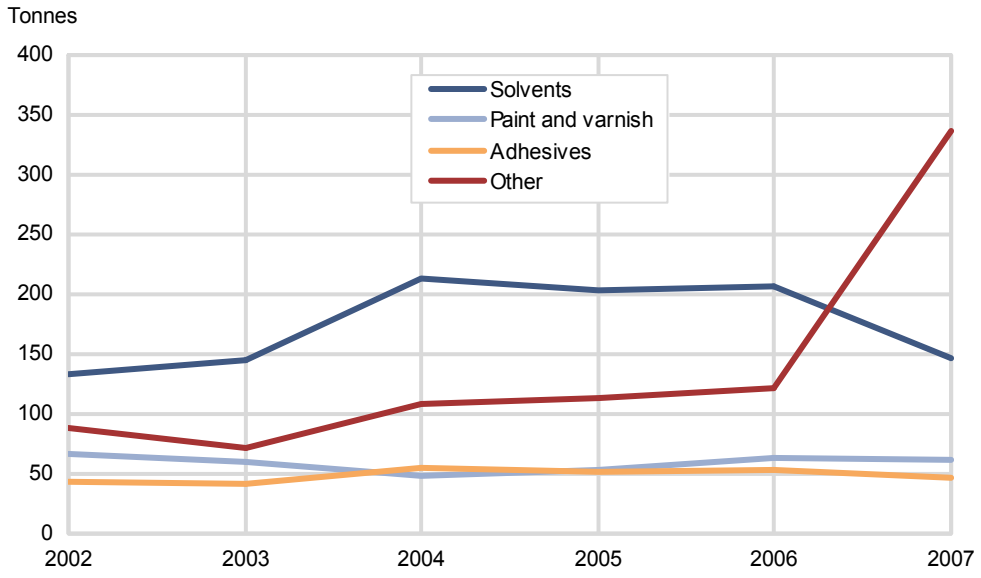
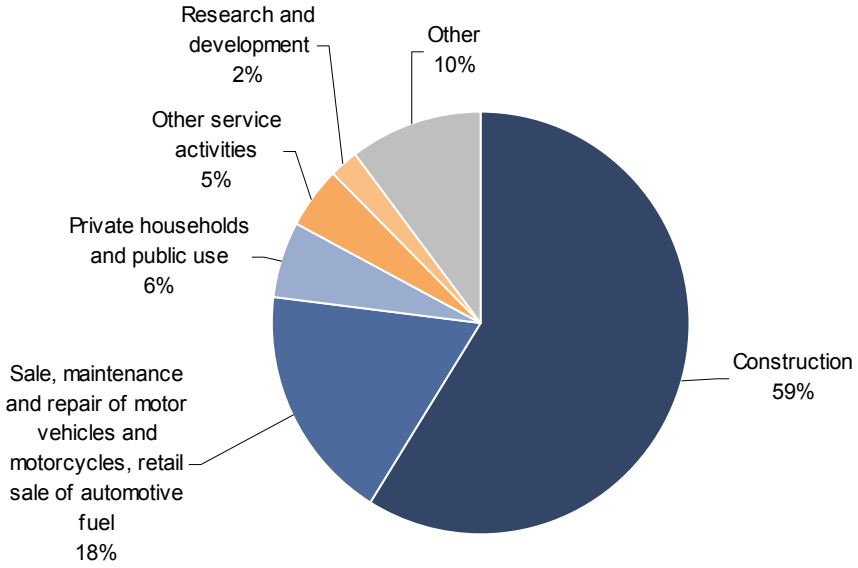


Figure 4.14. Emissions of chronically toxic substances from products other than energy goods from industrial sectors other than the manufacturing industries, 2007. Per cent



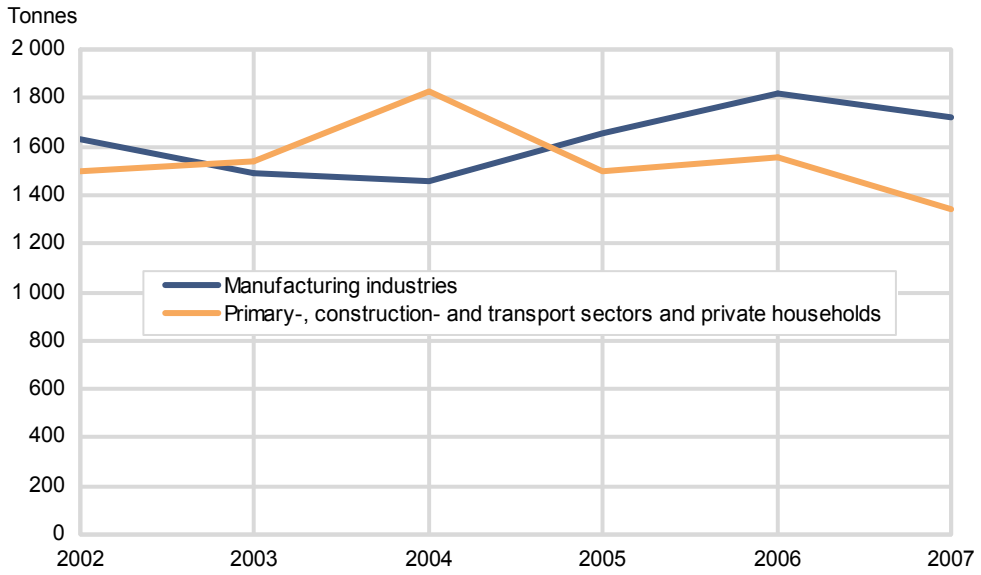
In 2007, the construction industry was responsible for 59 per cent of the emissions of chronically toxic substances from non-energy products in the primary-, construction- and transport sectors and private households (Figure 4.14 Toluene (CAS number 108-88-3) constitutes nearly ½ of the emissions of chronically toxic substances in the primary-, construction- and transport sectors and private households. This substance is a component of paint and varnish, adhesives and solvents, and is used in a wide range of industrial sectors.

4.4. Sensitising substances

The overall use and emission of substances with sensitising effects have been relatively stable during the past six years. Production and use of paint and varnishes are the main sources of these emissions, but several product types, displaying partly counteracting trends, contribute considerably to the emission figures.

There are only negligible emissions from energy goods within the hazard category sensitising substances. For a detailed summary of product types and substances contributing to emissions of sensitising substances in 2007, see appendices B1 and B2.

Figure 4.15. Emissions of sensitising substances in manufacturing industries and other industrial sectors, 2002-2007. Tonnes



Manufacturing industries

The manufacturing industries contributed to approximately 56 per cent of the emissions of sensitising substances in 2007. This is the highest percentage of total emissions of sensitising substances during the time series (Figure 4.15). In 2003 and 2004, the emissions of sensitising substances from the manufacturing industries were calculated to be less than the emissions from the primary-, construction- and transport sectors and private households.

Within the manufacturing industries, the emissions of sensitising substances has been relatively stable from the use of construction materials and raw materials in the 2002-2007 time period, while the emissions from biocides increased considerably from 2004-2006 (Figure 4.16). These emissions have decreased in 2007. Sensitising substances are present in a wide range of products. Within the manufacturing industries, more than 80 different product types are calculated to contribute to emissions of this hazard group.

The most dominant manufacturing industries, when it comes to emissions of sensitising substances in 2007, are the manufacture of furniture (and manufacture not accounted for elsewhere), the manufacture of transport equipment other than cars, the manufacture of food and beverages as well as the manufacture of chemicals and chemical products (Figure 4.17). Within the production of furniture sensitising substances are emitted particularly from foaming and moulding agents. Within the manufacture of transport equipment except motor vehicles it is especially the building and repair of ships and boats that leads to emissions of sensitising substances, and the emissions are largest from phtalic anhydride (CAS number 85-44-9) and maleic anhydride (CAS number 108-31-6) from plastic construction materials, and from antifouling agents. Within the manufacture of food and beverages, the product type “biocides” is group with the largest emissions.

Figure 4.16. Emissions of sensitising substances in the manufacturing industries, by product types, 2002-2007. Tonnes

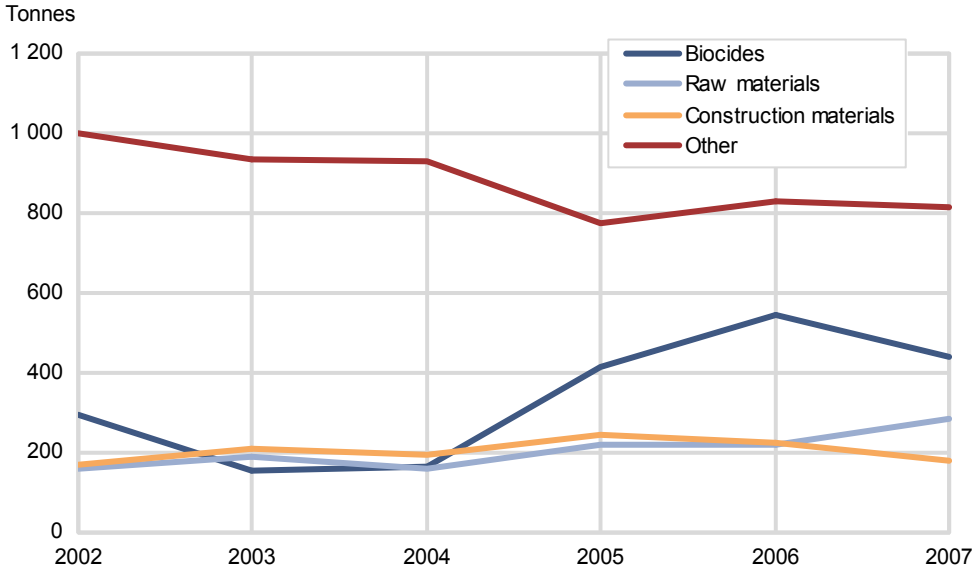
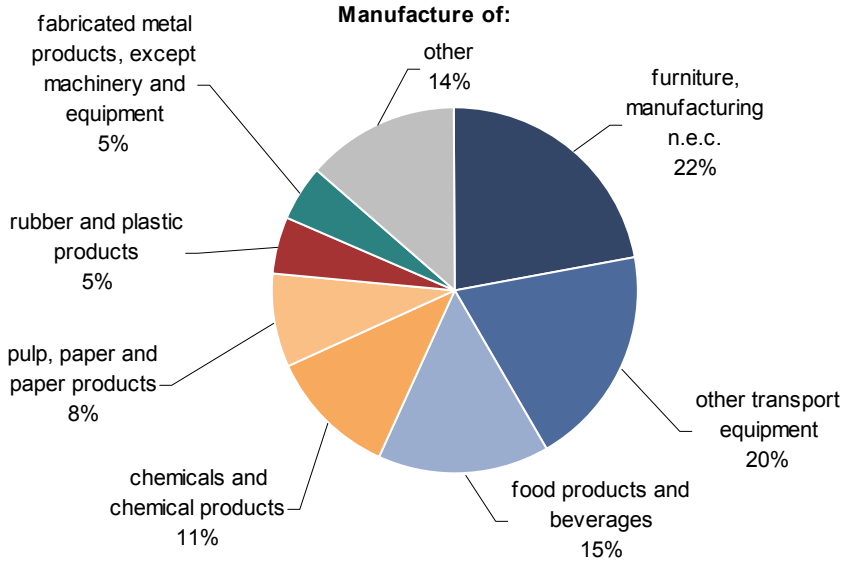


Figure 4.17. Emissions of sensitising substances by industrial sectors within the manufacturing industries, 2007. Per cent



Primary-, construction- and transport sectors and private households

For the primary-, construction- and transport sectors and private households, there has been a substantial decrease in the emissions of sensitising substances from 2004 to 2007. The lion's share of this reduction has been due to reduced emissions from paint and varnish (Figure 4.18). The demands for reducing the VOC (volatile organic compounds) content of paint and varnish has been increasingly strict for the past years (Produktforskriften 2004 Annex VII), and these regulations are probably the direct cause of the decrease in emissions from paint and varnish. By dividing the sensitising substances emitted from paint and varnish used in the primary-, construction- and transport sectors and private households into VOC substances and non-VOC substances, this becomes evident. Approximately one third of the 87 sensitising substances emitted from paint and varnish in the primary-, construction- and transport sectors and private households are VOC, and these show a more pronounced decrease in emissions from 2003 until 2007 (Figure 4.19). This gives a good indication that legislative measures to reduce emissions actually have an impact on emissions.

Figure 4.18. Emissions of sensitising substances in industrial sectors other than the manufacturing industries, 2002-2007. Tonnes

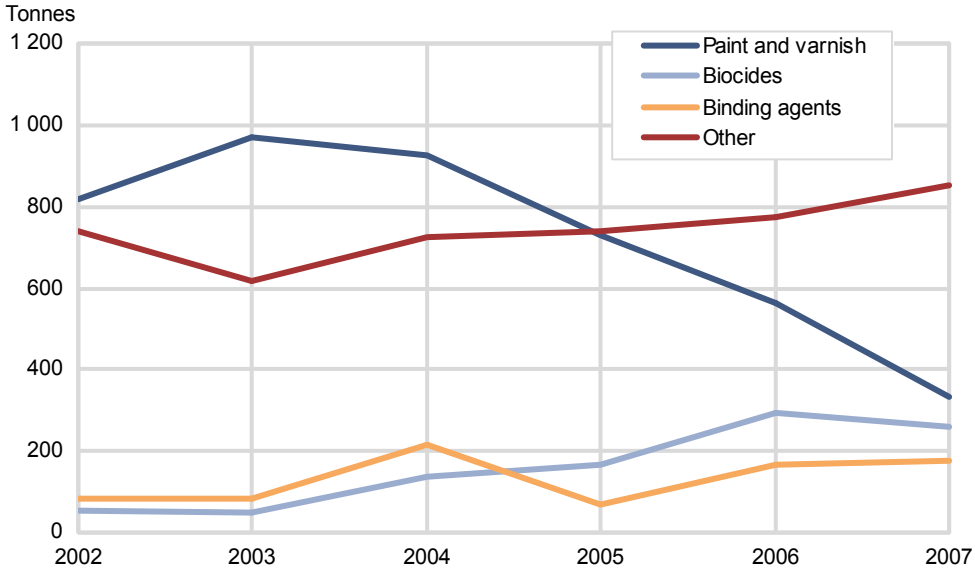
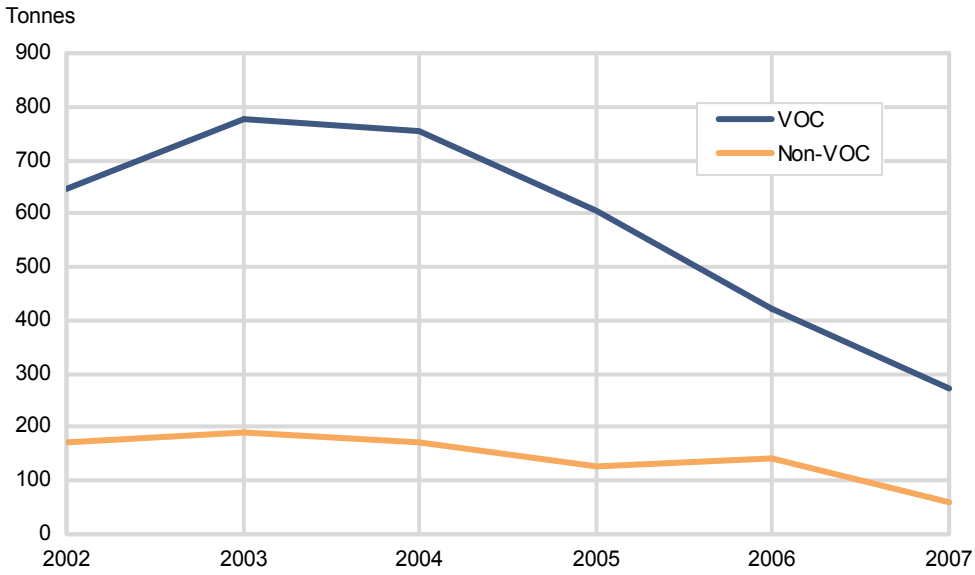


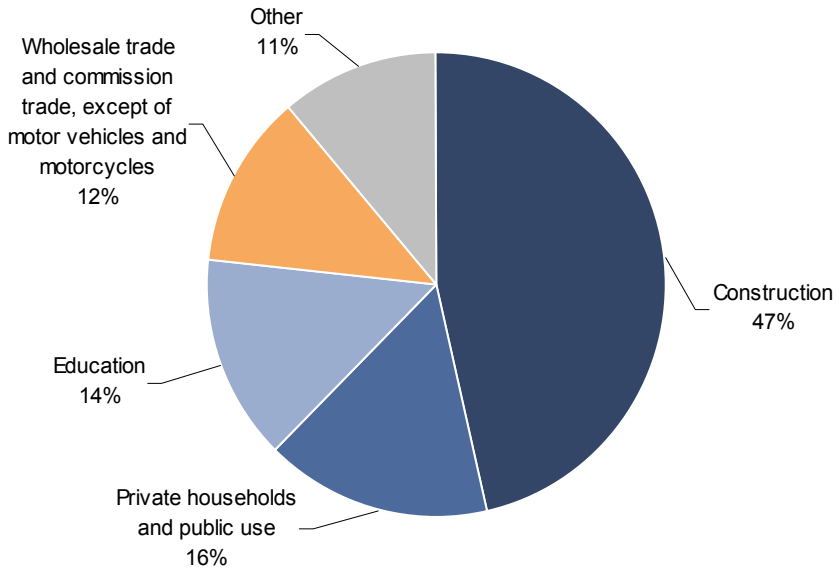
Figure 4.19. Emissions of sensitising substances from VOC and non-VOC in paint and varnish, 2002-2007. Tonnes



For a detailed list of product types and substances contributing to emissions of sensitising substances from the use of non-energy goods in the primary-, construction- and transport sectors and private households in 2007, see appendices B3 and B4.

Within the primary-, construction- and transport sectors and private households, construction caused the largest emissions of sensitising substances in 2007 (Figure 4.20). It is mainly the use of paint and varnish and flooring materials that leads to emissions from construction, while paint and varnish and cleaning agents are important emission sources from private households and public use.

Figure 4.20. Emissions of sensitising substances from industrial sectors other than the manufacturing industries, 2007. Per cent



4.5. Substances dangerous for the environment

Emissions of substances classified as dangerous for the environment rose considerably in the beginning of the period, but displayed a considerable decrease from 2005 to 2007. The peak in 2004-2005 was a result of a combined effect of increased use of biocides and a high consumption rate in the manufacturing industries. It coincides with a change in the duty of declaration, but data analysis suggests that the increase is true and not caused solely by changes in the duty of declaration (cf. section 3.3.4). The subsequent reduction is mainly due to a decline in the use of these substances in manufacturing industries (Figure 4.21).

There are only negligible emissions from energy goods within the hazard category substances dangerous for the environment. For a detailed summary of product types and substances contributing to emissions of substances dangerous for the environment in 2007, see appendices B1 and B2.

Manufacturing industries

While there has been an overall decrease in the emissions of substances dangerous for the environment from the manufacturing industries from 2005 to 2007, the emissions from different product type groups show no particular trend (Figure 4.22), as the decrease in emissions is spread on a wide range of products. A reduction in the emissions from the manufacturing industries could possibly be due to either reduced activity or a change in the substances used within the industries. The production index (Statistics Norway 2009) gives an indication of the overall activity within the manufacturing industries, and this index displays increased activity in the time period (Figure 4.22). This indicates that the reduced emissions of sensitising substances are due not to decreasing production, but to less use of substances caused by a shift in the production procedures.

Figure 4.21. Emissions of substances dangerous for the environment in manufacturing industries and other industrial sectors, 2002-2007. Tonnes

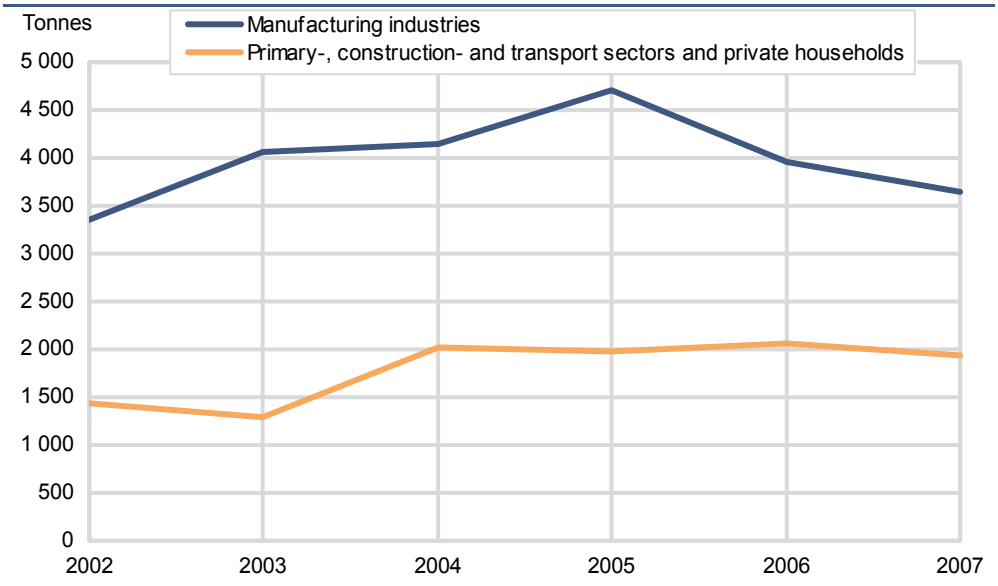
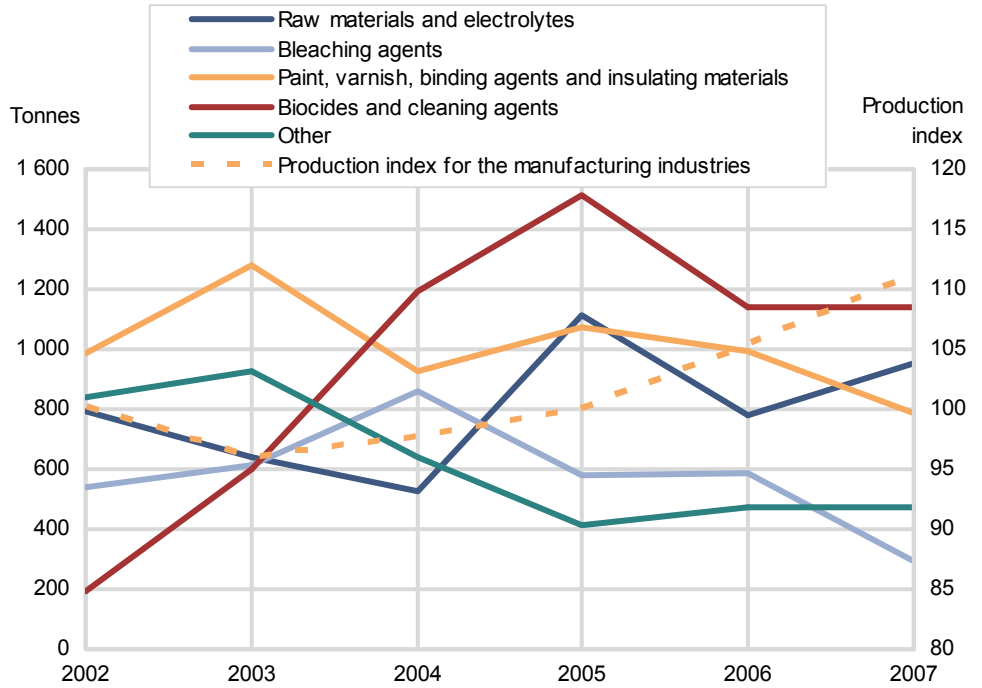
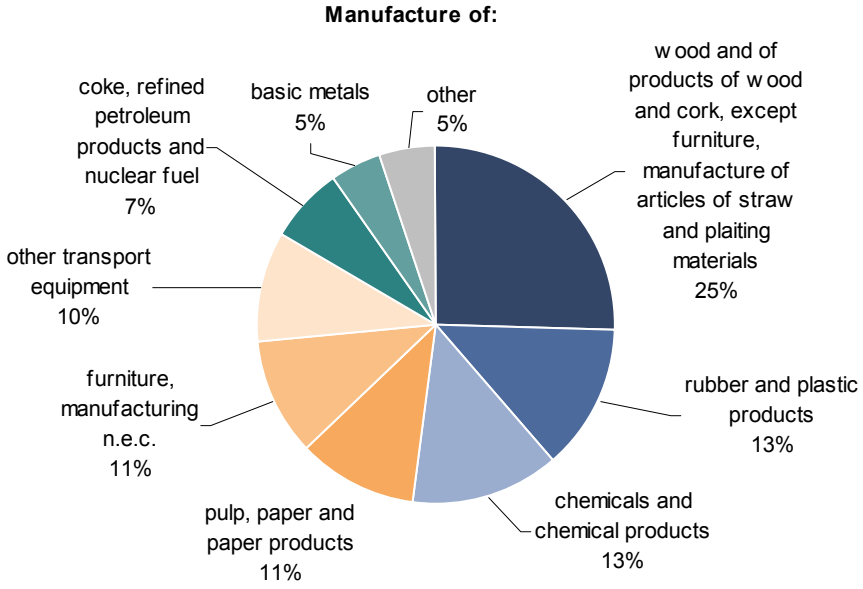


Figure 4.22. Emissions of substances dangerous for the environment in the manufacturing industries, by product types and production index for the manufacturing industries, 2002-2007. Tonnes and Index (2005=100)



Emissions of substances dangerous for the environment from the manufacturing industries are spread over many different industrial sectors (Figure 4.23). Within the manufacture of wood and products of wood the product type group with the highest emissions is wood preservatives. The consumption of these products has increased considerably throughout the time series. Within the manufacture of rubber and plastic products, insulation materials is the largest emission source, while raw materials are most prominent within the manufacture of chemicals and chemical products. While the emissions of these two product types from these two manufacturing industries are in the same order of magnitude, the consumption of raw materials in the manufacture of chemicals and chemical products are more than 300 times higher than the consumption of insulation materials in the manufacture of rubber and plastic products. Raw materials are assumed used in closed production loops with very low emissions.

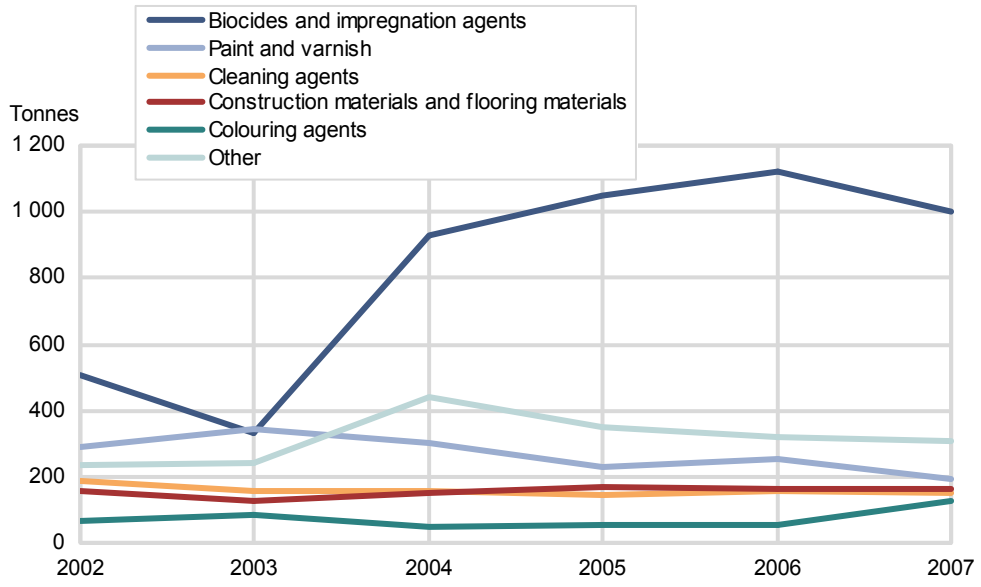
Figure 4.23. Emissions of substances dangerous to the environment by industrial sectors within the manufacturing industries, 2007. Per cent



Primary-, construction- and transport sectors and private households

The emissions of substances dangerous for the environment from the primary-, construction- and transport sectors and private households have been relatively stable from 2004 (Figure 4.21.) However, the calculated emissions of biocides and impregnation agents increased dramatically from 2003-2004 (Figure 4.24). From 2004, the biocidal regulation (Biocidforskriften 2004) came into force, and the duty of declaration for biocidal products was established. This may have had some effect on the declared volumes of such products. At the same time, declaration of antifouling paint containing biocides and cleaning agents with an active component was moved from paint and varnish and cleaning agents to biocides (Mette Follestad, Norwegian Product Register, *pers. comm.* 2008). The decrease in emissions from paint and varnish from 2003-2005 may thus be the result of a transfer of declarations to biocides and impregnation agents.

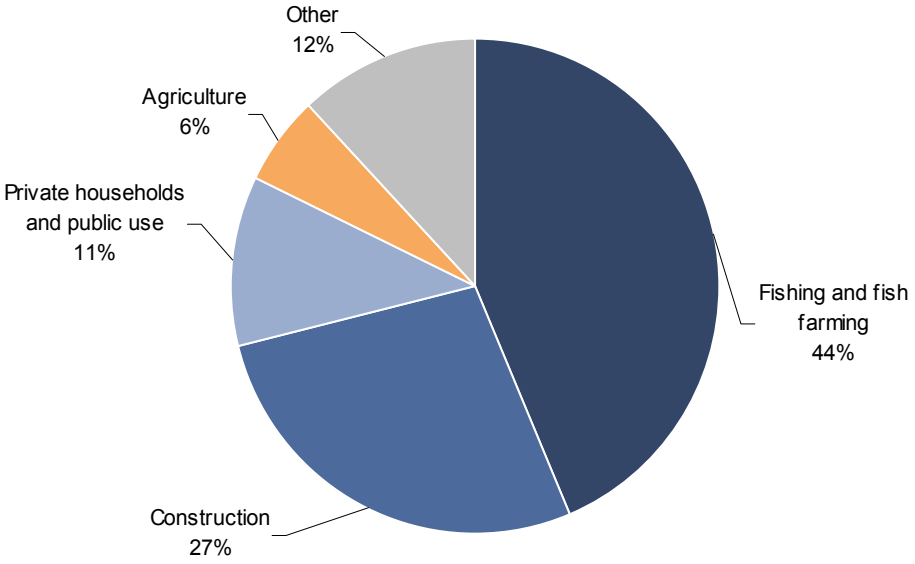
Figure 4.24. Emissions of substances dangerous for the environment in industrial sectors other than the manufacturing industries, 2002-2007. Tonnes



For a detailed list of product types and substances contributing to emissions of sensitising substances from the use of non-energy goods in the primary-, construction- and transport sectors and private households in 2007, see appendices B3 and B4.

Fishing and fish farming is the non-manufacturing industry that causes the largest emissions of substances dangerous for the environment (Figure 4.25). This is largely dicopper oxide (CAS number 1317-39-1) used for cleaning nets in the fish farming industry. Within construction emissions of substances dangerous for the environment stem from the use of paint and varnish and a wide range of other construction materials. From private households and public use the emissions are most prominent from biocides, paint and varnish and colouring agents.

Figure 4.25. Emissions of substances dangerous for the environment from industrial sectors other than the manufacturing industries, 2007. Per cent



4.6. Excluded substances

Compounds that cannot be given an unequivocal hazard classification, and thus are excluded from the previous emission estimates, are used in relatively large quantities. However, assuming that the average content of the carcinogenic substances is 0.1 per cent and applying the same emission factors as for the other substances, relatively low emission estimates are produced for these compounds: 16-26 tonnes per year (i.e., around 0.1 per cent). Thus, given that the assumption holds, excluding these compounds has little effect on the emission estimates for the CMR-category.

5. Uncertainties

5.1. Overall uncertainties

The uncertainty analysis is performed on non-weighted emission estimates. The uncertainties are represented as two standard deviations. A 95 per cent confidence interval for the emission level is obtained by subtracting the negative uncertainty and adding the positive uncertainty to the calculated emissions within each hazard category and each year.

The numerical uncertainties are far greater for CMR substances than for the other hazard categories (Figure 5.1). Chronically toxic substances, sensitising substances and substances dangerous for the environment have low uncertainties. The percentual aggregated uncertainty, on the other hand, are low for the hazard categories "Dangerous for the environment" and "Sensitising", amounting to no more than 5-11 per cent of the emission level for the negative uncertainty and 0.3-3 per cent of the positive uncertainty. The emissions of both chronically toxic and CMR substances have a high relative uncertainty of 21-40 per cent (both positive and negative) (Table 5.1).

Figure 5.1. Emissions by hazard category, with uncertainties. 2005-2007. Tonnes

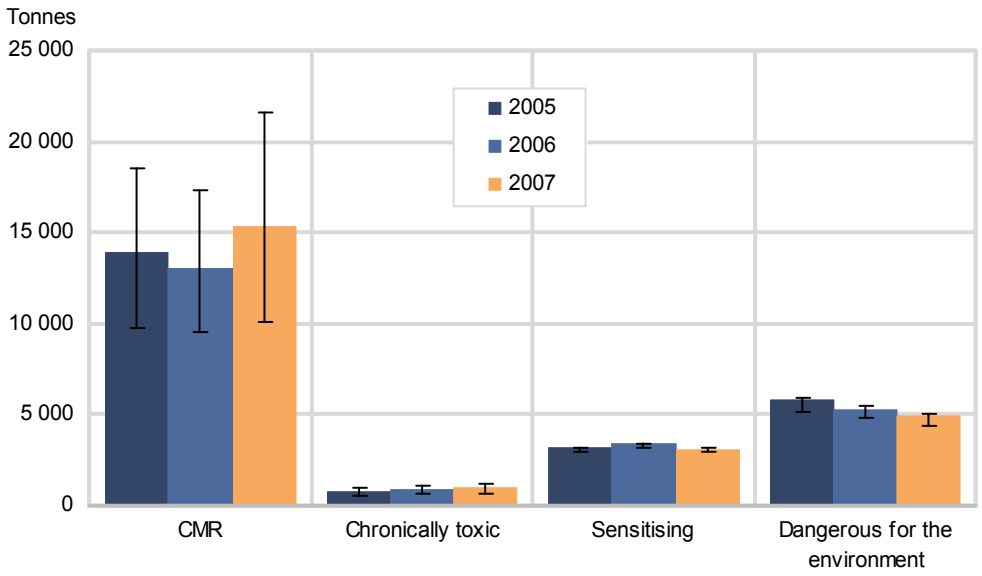


Table 5.1. Aggregated uncertainties in level per hazard category, 2005-2007. Tonnes and per cent of emissions

	2005				2006				2007			
	Negative		Positive		Negative		Positive		Negative		Positive	
	Tonnes	Per cent of emissions	Tonnes	Per cent of emissions	Tonnes	Per cent of emissions	Tonnes	Per cent of emissions	Tonnes	Per cent of emissions	Tonnes	Per cent of emissions
CMR	4118	29.6	4622	33.3	3603	27.5	4211	32.1	5326	34.6	6244	40.5
Chronically toxic	248	31.0	200	25.0	276	30.7	228	25.3	293	29.3	217	21.7
Sensitising	236	7.4	8	0.3	239	7.0	9	0.3	169	5.5	51	1.6
Dangerous for the environment	617	10.6	79	1.4	526	9.9	156	2.9	543	11.1	169	3.4

In order of a trend to be significant, the change must be larger than the uncertainty. If there is a negative trend, the calculated change from one year to the next must exceed the positive uncertainty in order to be significant, and vice versa. All between-year changes were significant, except for the change between 2005 and 2006 for CMR substances, and 2005-2007 for sensitising substances (Figure 5.2 and Table 5.2).

Figure 5.2. Between-year changes in emissions with uncertainties, by hazard category, 2005-2007. Tonnes

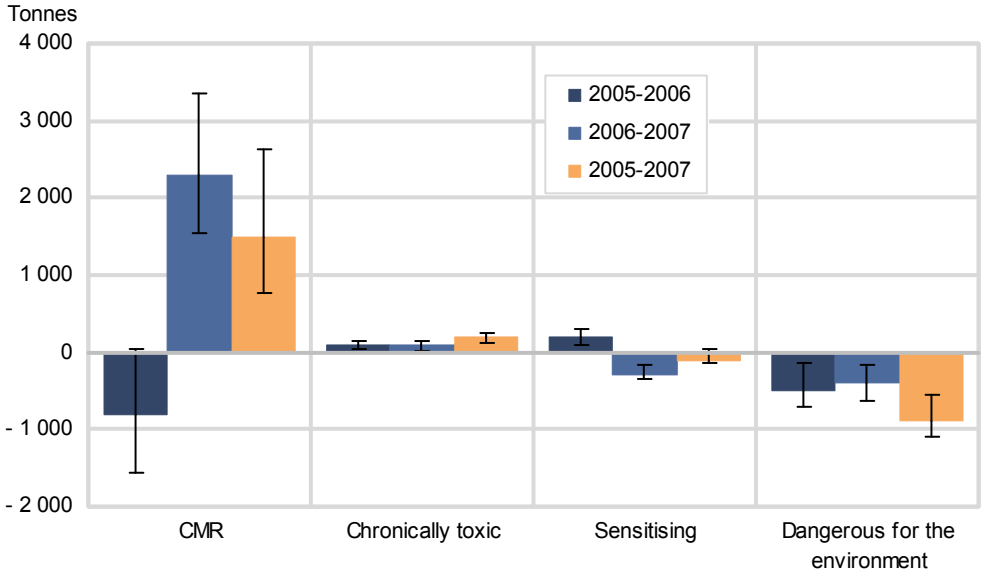


Table 5.2. Aggregated uncertainties in trend per hazard category, 2005-2007. Tonnes

	2005-2006		2006-2007		2005-2007	
	Negative	Positive	Negative	Positive	Negative	Positive
CMR	752	856	749	1059	723	1137
Chronically toxic	58	58	81	53	79	51
Sensitising	103	101	36	148	35	145
Dangerous for the environment	194	362	240	236	187	351

There are a few substances or groups of substances that contribute to high uncertainty of CMR and chronically toxic substances. By changing the assumptions of the uncertainty calculations of these substances, i.e. by obtaining group 1 emission factors (c.f. section 3.8.1) for substances used in large quanta, these uncertainties can be reduced substantially.

CMR substances:
B55100 (Motor fuel) and B55300 (Other fuels) are used in large quanta, and is a source of large uncertainties in the emission estimates. The uncertainty can be reduced substantially by obtaining more certain activity data and emission factors for substances used within these product types.

B15315 (Wood preservatives) is a product type with simplified declarations, and the emission factor (0.5) is gathered from the KemI report (Fischer *et al.* 2005). This causes high uncertainty both for the activity data and the emission factor.

Chronically toxic substances:
Toluene (CAS number 108-88-3) (within product types L10202, M10300, M05243 and O15100) contributes considerably to the uncertainty for chronically toxic substances. The emission factor within these product types are gathered from the SMED report (Skårman *et al.* 2006), which yields high uncertainties when the emission factors are high.

Other considerable sources of uncertainty within this hazard category are energy goods (B55100 and B55300) and some substances with large quanta and emission factor 0.5 from the KemI report (Fischer *et al.* 2005).

5.2. Sensitivity analysis

The effect of reducing the uncertainty was tested for three sources of high uncertainty; Simplified declarations, high emission factors gathered from Skårman et al. (2006) and the emission factor for energy goods (B55100).

Simplified declarations: If the intermediate value of the interval was used as estimated for simplified declarations, and the interval was considered a 95 per cent confidence interval, the uncertainty would have been about halved for the activity data on these substances. On the other hand, the suitability of such an estimation procedure must be evaluated, as it may lead to an underestimation if the true amount is closer to the maximum than the minimum declared amount. Such a change in estimation routines may lead to a slightly higher positive uncertainty, but will yield a smaller negative uncertainty. The sensitivity analysis showed that such a change would reduce the negative uncertainty by about ten per cent for the hazard categories "Sensitising" and "Dangerous for the environment". It will have little or no effect on the other hazard categories or on the positive uncertainty. The measure will thus have little effect, as it primarily affects uncertainties that are already low.

Emission factors from Skårman et al. (2006): By setting the uncertainty equal to twenty per cent of the emission factor, the uncertainty is high when the emission factor is high. For emission factors from other sources, the uncertainty is highest when the emission factor is close to 0.5, and lower when the emission factor is close to zero or one. This is intuitively more logical, as the emissions can be established with larger certainty when almost everything or almost nothing is emitted. Determining the uncertainty of the emission factors from Skårman et al. (2006) differently should thus be considered. However, the sensitivity analysis showed that setting the uncertainty equal to twenty per cent when the emissions factor was lower than 0.5 and twenty per cent of (1- emission factor) when the emission factor was higher than 0.5, reduced the uncertainty with less than five per cent within all hazard categories. This measure would thus have little effect on the overall uncertainty.

Energy goods (B55100): All energy goods used in other sectors than the manufacture of coke, refined petroleum products and nuclear fuel are given the emission factor 0.0025. This number is a mean of 0.05, which is gathered from emission statistics for petrol and diesel, and 0.000005, which is gathered from emission statistics for heating fuel. These numbers are gathered from Fischer et al. (2005). The uncertainty is now assumed to be 0.0025, and this is the largest source of uncertainty in the emission estimates. By incorporating separate emission factors for petrol, diesel and heating fuel and by evaluating emission factors for large groups of other energy goods, the uncertainty of the emissions of CMR substances could be reduced considerably. If the uncertainty of this emission factor was reduced to 0.0005, the uncertainty of the level of CMR emissions would be reduced by 70 per cent. Omitting the information about emission factors from different parts of B55100 is thus the largest source of uncertainty in the emission calculations.

5.3. Hazard weights

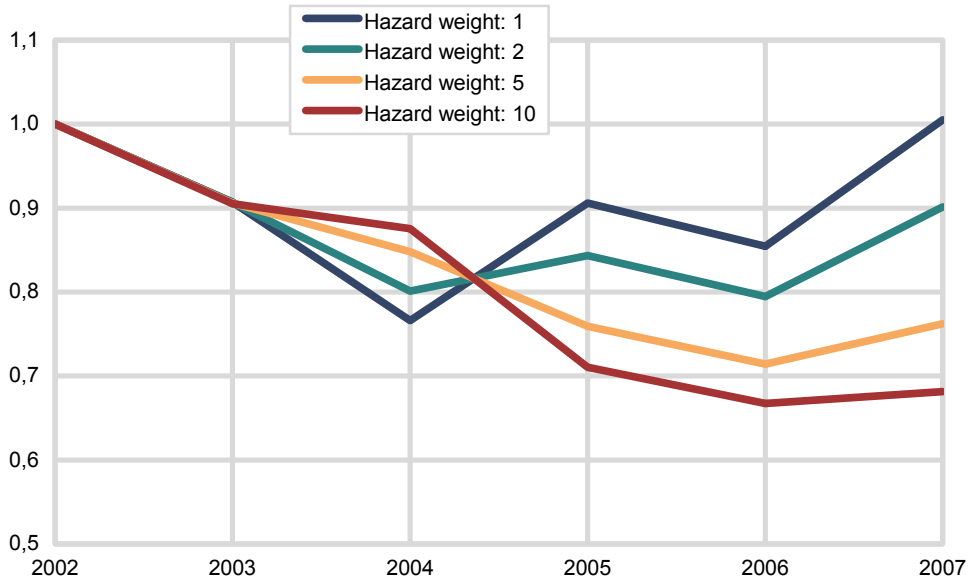
In this section, the effect of weighing substances according to hazard is explored.

5.3.1. CMR substances

The CMR substances were split up in two groups; Category A comprising the most hazardous CMR substances, and category B containing the least dangerous CMR substances (see section 3.8.6). The emissions in category A are lower than in category B, and category B thus dominates the trend in emissions. However, as category A emissions are given increasing weights, these substances become vital for the trend (Figure 5.3). When category A substances are assigned weight one,

the trend depicted in Figure 5.3 is equal to the emission trend for CMR substances (the blue lines) in Figure 4.1.

Figure 5.3. Hazards of CMR substances, 2002-2007. Category A substances are assigned hazard weights from 1-10, category B substances are assigned weight 1. Index (2002=1)



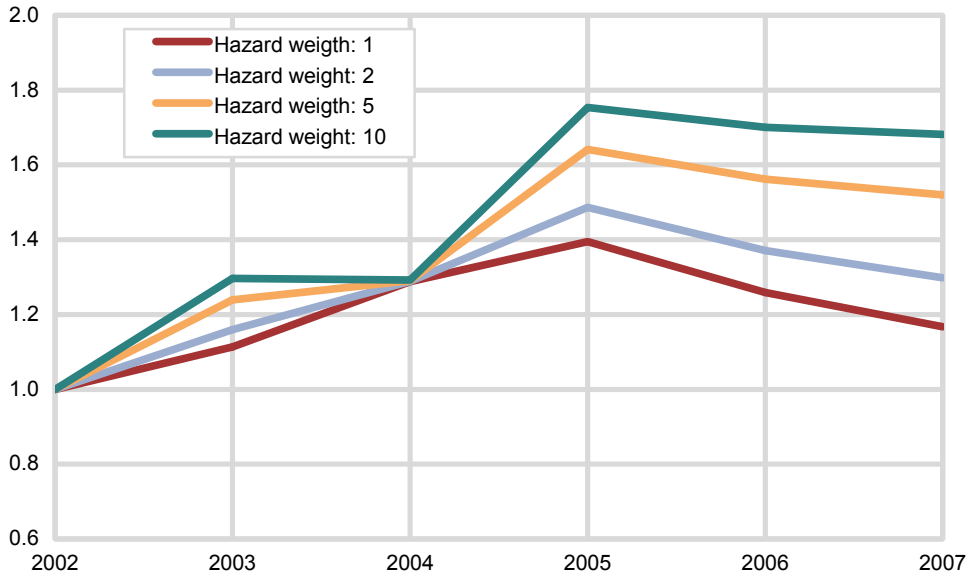
Within category B (i.e. the less hazardous substances that are not hazard weighted – or all are given hazard weight = 1) the emissions have increased the most for fuel oil, no. -2 (CAS number 68476-30-2) and diesel fuel (CAS number 68334-30-5). This coincides with an increase in the sale of these substances during the 2002-2007 time period. However, some substances belonging to category A (i.e. the most hazardous of the CMR substances) seem to have been removed from fuel during the past few years. The decrease in category A is mainly due to reduced emissions from fuels used in land and water transport (such as buses, ferries and freight transport by road or water).

5.3.2. Substances dangerous for the environment

While the overall emissions of substances dangerous for the environment have shown a decline in the past few years, the hazard weighing indicates that the occurrence of substances considered to be most dangerous, i.e. the PBT substances, has been stable from 2005 to 2007 (Figure 5.4), and the decline shown in the emission estimates (Figure 4.1) for substances dangerous for the environment is to an increasing degree diminished as category A substances are given higher weights. When category A substances are assigned weight one, the trend depicted in Figure 5.3 is equal to the emission trend for substances dangerous for the environment in Figure 4.1 (the red lines).

The considerable increase in category A emissions from 2002 to 2005 was largely due to increased consumption of biocides. The emissions of PBT substances from biocides have decreased slightly from 2005 to 2007, but this group of substances still constituted more than one third of the emissions of PBT substances in 2007. These substances are defined as fulfilling PBT criteria under the work of the interim stategy for REACH and the Existing substances Regulation.

Figure 5.4. **Hazards of substances dangerous for the environment, 2002-2007. Category A substances are assigned hazard weights from 1-10, category B substances are assigned weight 1. Index (2002=1)**



6. Areas of methodological improvement

Main areas of improvement are given in prioritised order below. The priority-setting is based on the current assessment of the importance of the improvements as well as the expected resource need for each task.

Emission factors

Further efforts to identify and adopt emission factors from sources other than the ones currently in use, are recommended. Important sources such as reports from the Norwegian Pollution Control Authority and the Technical Guidance Document on Risk Assessment (European Chemicals Bureau 2003) can undoubtedly provide valuable information.

Activity data

At present, the statistics on hazardous substances only cover the emission of substances as generated by use of products declared to the Norwegian Product Register in accordance with the duty of declaration. The emission estimates would undoubtedly benefit from increased quality and completeness of the Product Register data. Furthermore, other sources of information on use and emission should be identified and evaluated.

Possible supplementary data include figures on pesticide consumption from Statistics Norway and various data from the Norwegian Pollution Control Authority, such as reported emissions of hazardous substances from primary production of such substances, from deposited products and from other processes that generate the substance in other ways. An example is the use of HFC on vegetation. This emission of fluorine is not included in the current estimates as they are limited to the emissions of a certain substance caused by the use of this substance.

Data should be compared with and analysed in relation to statistics on external trade, and the completeness of the statistics on hazardous substances will be increased by including information about emissions from the oil industry. Potential data sources for these emissions are reporting from the industry itself or discharge permits from the Norwegian Pollution Control Authority.

In addition, the information value of the statistics might be strengthened if more (less hazardous) substances are included (cf. section 3.2.1).

Hold up and emissions distributed over years

Some of the products declared to the Product Register a given year are probably stored and used (or exported) in subsequent years. The extent of this should be evaluated and possibly taken into account in the emission model, e.g. by using a moving average.

Furthermore, when a product containing hazardous substances is used over several years, e.g. construction materials, the emissions will probably take place during the whole lifetime of the product. Such product-specific delay in emissions can be included in the current model, but a considerable amount of additional information is required.

Hazard weights

One of the first steps towards an approximate quantification of risk of hazardous substances is to give emission figures for different substances weights according to their hazardous properties. This has been done as a first, rough attempt for CMR substances and substances dangerous for the environment in this study.

However, the actual weighting has been done in a somewhat arbitrary manner. We have no indication that the category A substances within the two hazard categories are twofold, five or ten times more hazardous than the remaining substances. Thus, a necessary further development of the hazard weights is to evaluate the numerical weighing of the most hazardous substances within each hazard category.

Recipient distribution

At present, emission estimates are not split up into figures for the different emission recipients, i.e. air, water, soil and biota. However, the model has been developed so that this division can easily be done, given that the necessary information on emission distribution among recipients is obtained.

Lifetime of substances

In an evaluation of consequences of emissions, the lifetime of each substance in each recipient is of crucial importance. Substances that are swiftly transformed into non-harmful substances will pose less risk to human health and the environment than substances with a long lifetime. Thus, a long-term objective is to gather information about lifetime for substances and to incorporate this information in the model.

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Appendix A

Code lists

A1. List of R-phrases

R-phrases (short for **Risk Phrases**) are defined in Annex III of European Union Directive 67/548/EEC: *Nature of special risks attributed to dangerous substances and preparations* (European Commission 1967).

R1: Explosive when dry
R2: Risk of explosion by shock, friction, fire or other sources of ignition
R3: Extreme risk of explosion by shock, friction, fire or other sources of ignition
R4: Forms very sensitive explosive metallic compounds
R5: Heating may cause an explosion
R6: Explosive with or without contact with air
R7: May cause fire
R8: Contact with combustible material may cause fire
R9: Explosive when mixed with combustible material
R10: Flammable
R11: Highly flammable
R12: Extremely flammable
R14: Reacts violently with water
R15: Contact with water liberates extremely flammable gases
R16: Explosive when mixed with oxidising substances
R17: Spontaneously flammable in air
R18: In use, may form flammable/explosive vapour-air mixture
R19: May form explosive peroxides
R20: Harmful by inhalation
R21: Harmful in contact with skin
R22: Harmful if swallowed
R23: Toxic by inhalation
R24: Toxic in contact with skin
R25: Toxic if swallowed
R26: Very toxic by inhalation
R27: Very toxic in contact with skin
R28: Very toxic if swallowed
R29: Contact with water liberates toxic gas.
R30: Can become highly flammable in use
R31: Contact with acids liberates toxic gas
R32: Contact with acids liberates very toxic gas
R33: Danger of cumulative effects
R34: Causes burns
R35: Causes severe burns
R36: Irritating to eyes
R37: Irritating to respiratory system
R38: Irritating to skin
R39: Danger of very serious irreversible effects
R40: Limited evidence of a carcinogenic effect
R41: Risk of serious damage to eyes
R42: May cause sensitisation by inhalation
R43: May cause sensitisation by skin contact
R44: Risk of explosion if heated under confinement
R45: May cause cancer
R46: May cause heritable genetic damage
R48: Danger of serious damage to health by prolonged exposure
R49: May cause cancer by inhalation
R50: Very toxic to aquatic organisms
R51: Toxic to aquatic organisms
R52: Harmful to aquatic organisms
R53: May cause long-term adverse effects in the aquatic environment
R54: Toxic to flora
R55: Toxic to fauna
R56: Toxic to soil organisms

R57: Toxic to bees
R58: May cause long-term adverse effects in the environment
R59: Dangerous for the ozone layer
R60: May impair fertility
R61: May cause harm to the unborn child
R62: Possible risk of impaired fertility
R63: Possible risk of harm to the unborn child
R64: May cause harm to breast-fed babies
R65: Harmful: may cause lung damage if swallowed
R66: Repeated exposure may cause skin dryness or cracking
R67: Vapours may cause drowsiness and dizziness
R68: Possible risk of irreversible effects
R14/15: Reacts violently with water, liberating extremely flammable gases
R15/29: Contact with water liberates toxic, extremely flammable gases
R20/21: Harmful by inhalation and in contact with skin
R20/22: Harmful by inhalation and if swallowed
R20/21/22: Harmful by inhalation, in contact with skin and if swallowed
R21/22: Harmful in contact with skin and if swallowed
R23/24: Toxic by inhalation and in contact with skin
R23/25: Toxic by inhalation and if swallowed
R23/24/25: Toxic by inhalation, in contact with skin and if swallowed
R24/25: Toxic in contact with skin and if swallowed
R26/27: Very toxic by inhalation and in contact with skin
R26/28: Very toxic by inhalation and if swallowed
R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed
R27/28: Very toxic in contact with skin and if swallowed
R36/37: Irritating to eyes and respiratory system
R36/38: Irritating to eyes and skin
R36/37/38: Irritating to eyes, respiratory system and skin
R37/38: Irritating to respiratory system and skin
R39/23: Toxic: danger of very serious irreversible effects through inhalation
R39/24: Toxic: danger of very serious irreversible effects in contact with skin
R39/25: Toxic: danger of very serious irreversible effects if swallowed
R39/23/24: Toxic: danger of very serious irreversible effects through inhalation and in contact with skin
R39/23/25: Toxic: danger of very serious irreversible effects through inhalation and if swallowed
R39/24/25: Toxic: danger of very serious irreversible effects in contact with skin and if swallowed
R39/23/24/25: Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed
R39/26: Very Toxic: danger of very serious irreversible effects through inhalation
R39/27: Very Toxic: danger of very serious irreversible effects in contact with skin
R39/28: Very Toxic: danger of very serious irreversible effects if swallowed
R39/26/27: Very Toxic: danger of very serious irreversible effects through inhalation and in contact with skin
R39/26/28: Very Toxic: danger of very serious irreversible effects through inhalation and if swallowed
R39/27/28: Very Toxic: danger of very serious irreversible effects in contact with skin and if swallowed
R39/26/27/28: Very Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed
R42/43: May cause sensitisation by inhalation and skin contact
R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation
R48/21: Harmful: danger of serious damage to health by prolonged exposure in contact with skin
R48/22: Harmful: danger of serious damage to health by prolonged exposure if swallowed
R48/20/21: Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin
R48/20/22: Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R48/21/22: Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed

R48/20/21/22: Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed
R48/23: Toxic: danger of serious damage to health by prolonged exposure through inhalation
R48/24: Toxic: danger of serious damage to health by prolonged exposure in contact with skin
R48/25: Toxic: danger of serious damage to health by prolonged exposure if swallowed
R48/23/24: Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin
R48/23/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R48/24/25: Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed
R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R68/20: Harmful: possible risk of irreversible effects through inhalation
R68/21: Harmful: possible risk of irreversible effects in contact with skin
R68/22: Harmful: possible risk of irreversible effects if swallowed
R68/20/21: Harmful: possible risk of irreversible effects through inhalation and in contact with skin
R68/20/22: Harmful: possible risk of irreversible effects through inhalation and if swallowed
R68/21/22: Harmful: possible risk of irreversible effects in contact with skin and if swallowed
R68/20/21/22: Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed

A2. List of substances included in this study

Substances included in this study, supplied with CAS-numbers and hazard categories: cmr (CMR-effects), cht (chronically toxic effects), sen (sensitising effects) and env (dangerous for the environment). For CMR substances and substances dangerous for the environment, the categorization into weighing category A and B is included. Substances with classification notes are not included in emission estimates, and are excluded from the CMR hazard category.

CAS number	Substance name	Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
50-00-0	formaldehyde	cmr	cat. B		sen		
50-32-8	benzo(a)pyrene	cmr	cat. A		sen	env	cat. A
52-68-6	trichlorfon				sen	env	cat. B
53-70-3	dibenz[a,h]anthracene	cmr	cat. A			env	cat. B
55-55-0	bis(4-hydroxy-N-methylanilinium) sulphate			cht	sen	env	cat. B
55-63-0	nitroglycerine					env	cat. B
56-18-8	3,3'-iminodi(propylamine)				sen		
56-23-5	carbon tetrachloride	cmr	cat. B	cht		env	cat. B
56-35-9	bis(tributyltin) oxide					env	cat. A
56-55-3	benzo(a)anthracene	cmr	cat. A			env	cat. A
58-36-6	diphenoxarsin-10-yl oxide					env	cat. A
59-50-7	chlorocresol				sen		
60-35-5	acetamide	cmr	cat. B				
62-38-4	phenylmercury acetate			cht		env	cat. A
62-53-3	aniline	cmr	cat. B	cht	sen		
62-56-6	thiourea	cmr	cat. A			env	cat. B
64-67-5	diethyl sulphate	cmr	cat. A				
66-71-7	1,10-phenanthroline					env	cat. B
67-66-3	chloroform	cmr	cat. B	cht			
67-97-0	colecalciferol			cht			
68-12-2	N,N-dimethylformamide	cmr	cat. A				
71-43-2	benzene	cmr	cat. A	cht			
74-83-9	bromomethane	cmr	cat. B	cht			
74-87-3	chloromethane	cmr	cat. B	cht			
75-01-4	vinyl chloride	cmr	cat. A				
75-07-0	acetaldehyde	cmr	cat. B				
75-08-1	ethanethiol					env	cat. B
75-09-2	dichloromethane	cmr	cat. B				
75-12-7	formamide	cmr	cat. A				
75-21-8	ethylene oxide	cmr	cat. A				
75-56-9	methyloxirane	cmr	cat. A				
77-73-6	3a,4,7,7a-tetrahydro-4,7-methano-1H-indene					env	cat. B
77-78-1	dimethyl sulphate	cmr	cat. A		sen		
78-00-2	tetraethyllead					env	cat. A
78-30-8	tri-o-tolyl phosphate					env	cat. B
78-32-0	tri-p-tolyl phosphate					env	cat. B
78-59-1	3,5,5-trimethyl-2-cyclohexen-1-one	cmr	cat. B				
78-67-1	2,2'-dimethyl-2,2'-azodipropiononitrile					env	cat. B
78-78-4	2-methylbutane					env	cat. B
79-01-6	trichloroethylene (TRI)	cmr	cat. A			env	cat. A
79-06-1	acrylamide	cmr	cat. A	cht	sen		
79-07-2	2-chloroacetamide	cmr	cat. A		sen		
80-05-7	4,4'-Isopropylidenediphen	cmr	cat. A		sen	env	cat. A
80-15-9	alpha,alpha-dimethylbenzyl hydroperoxide			cht		env	cat. B
80-43-3	bis(alpha,alpha-dimethylbenzyl) peroxide					env	cat. B
80-62-6	methyl methacrylate				sen		
81-14-1	4'-tert-butyl-2',6'-dimethyl-3',5'-dinitroacetophenone (musk ketnoe)					env	cat. B
81-15-2	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	cmr	cat. B			env	cat. A
83-79-4	rotenone					env	cat. B
84-74-2	dibutyl phtalate	cmr	cat. A				
85-42-7	cyclohexane-1,2-dicarboxylic anhydride				sen		
85-43-8	1,2,3,6-tetrahydrophthalic anhydride				sen	env	cat. B
85-44-9	phthalic anhydride				sen		
85-68-7	benzyl butyl phthalate	cmr	cat. A			env	cat. B
86-50-0	azinphos-methyl				sen	env	cat. B
87-66-1	pyrogallol	cmr	cat. B			env	cat. B
87-90-1	symclosene					env	cat. B
88-04-0	4-chloro-3,5-xylenol				sen		
88-12-0	1-vinyl-2-pyrrolidone	cmr	cat. B	cht			
89-83-8	thymol					env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
90-43-7	biphenyl-2-ol					env	cat. B
90-94-8	4,4'-bis(dimethylamino)benzophenone	cmr	cat. A				
91-08-7	2-methyl-m-phenylene diisocyanate	cmr	cat. B		sen	env	cat. B
91-20-3	naphthalene	cmr	cat. B			env	cat. B
91-66-7	N,N-diethylaniline					env	cat. B
91-76-9	6-phenyl-1,3,5-triazine-2,4-diyldiamine					env	cat. B
92-43-3	1-phenyl-3-pyrazolidone					env	cat. B
92-52-4	biphenyl					env	cat. B
94-36-0	dibenzoyl peroxide				sen		
95-33-0	N-cyclohexylbenzothiazole-2-sulfenamide				sen	env	cat. B
95-50-1	1,2-dichlorobenzene					env	cat. B
95-53-4	O-toluidine	cmr	cat. A				
95-63-6	1,2,4-trimethylbenzene					env	cat. B
95-76-1	3,4-dichloroaniline				sen	env	cat. B
96-23-1	1,3-dichloropropan-2-ol	cmr	cat. A				
96-29-7	2-butanone oxime	cmr	cat. B		sen		
96-33-3	methyl acrylate				sen		
96-45-7	imidazolidine-2-thione	cmr	cat. A				
97-23-4	dichlorophen					env	cat. B
97-63-2	ethyl methacrylate				sen		
97-74-5	tetramethylthiuram monosulphide				sen	env	cat. B
97-86-9	isobutyl methacrylate				sen		
97-88-1	butyl methacrylate				sen		
97-90-5	ethylene dimethacrylate				sen		
98-01-1	2-furaldehyde	cmr	cat. B				
98-82-8	cumene					env	cat. B
98-83-9	2-phenylpropene					env	cat. B
98-87-3	alpha,alpha-dichlorotoluene	cmr	cat. B				
99-97-8	N,N-dimethyl-p-toluidine					env	cat. B
100-44-7	alpha-chlorotoluene	cmr	cat. A	cht			
100-97-0	methenamine				sen		
101-02-0	triphenyl phosphite					env	cat. B
101-61-1	N,N,N',N'-tetramethyl-4,4'-methylenedianiline	cmr	cat. A			env	cat. B
101-68-8	4,4'-methylenediphenyl diisocyanate				sen		
101-77-9	4,4'-methylenedianiline	cmr	cat. A	cht	sen	env	cat. B
101-83-7	dicyclohexylamine					env	cat. B
102-06-7	1,3-diphenylguanidine	cmr	cat. A			env	cat. B
102-77-2	2-(morpholinothio)benzothiazole				sen	env	cat. B
103-11-7	2-ethylhexyl acrylate				sen		
103-33-3	azobenzene	cmr	cat. A	cht		env	cat. B
103-65-1	propylbenzene					env	cat. B
103-83-3	benzyldimethylamine					env	cat. B
104-40-5	P-nonylphenol					env	cat. A
104-78-9	3-aminopropyldiethylamine				sen		
105-16-8	2-(diethylamino)ethyl methacrylate				sen		
106-46-7	1,4-dichlorobenzene	cmr	cat. B			env	cat. B
106-47-8	4-chloroaniline	cmr	cat. A		sen	env	cat. B
106-89-8	1-chloro-2,3-epoxypropane	cmr	cat. A		sen		
106-91-2	2,3-epoxypropyl methacrylate				sen		
106-94-5	1-bromopropane	cmr	cat. A	cht			
106-99-0	buta-1,3-diene	cmr	cat. A				
107-06-2	1,2-dichloroethane	cmr	cat. A			env	cat. A
107-13-1	acrylonitrile	cmr	cat. A		sen	env	cat. B
107-15-3	1,2-ethanediamine				sen		
107-19-7	prop-2-yn-1-ol					env	cat. B
107-22-2	glyoxal	cmr	cat. B		sen		
107-39-1	2,4,4-trimethylpent-1-ene					env	cat. B
107-64-2	dimethyldioctadecylammonium chloride					env	cat. A
108-08-7	2,4-dimethylpentane					env	cat. B
108-31-6	maleic anhydride				sen		
108-67-8	mesitylene					env	cat. B
108-87-2	methylcyclohexane					env	cat. B
108-88-3	toluene	cmr	cat. A	cht			
108-90-7	chlorobenzene					env	cat. B
108-95-2	phenol	cmr	cat. B	cht			
109-55-7	3-aminopropyldimethylamine				sen		
109-66-0	pentane					env	cat. B
109-86-4	2-methoxy-ethanol	cmr	cat. A				
110-01-0	tetrahydrothiophene					env	cat. B
110-65-6	but-2-yne-1,4-diol			cht	sen		
110-71-4	1,2-dimethoxyethane	cmr	cat. A				
110-80-5	2-ethoxyethanol	cmr	cat. A				
110-82-7	cyclohexane					env	cat. B
110-85-0	piperazine				sen	env	cat. B
110-88-3	1,3,5-trioxane	cmr	cat. A				
111-15-9	2-ethoxyethyl acetate	cmr	cat. A				
111-30-8	glutaral				sen		

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
111-40-0	2,2'-iminodi(ethylamine)				sen		
111-42-2	2,2'-iminobis-ethanol			cht			
111-65-9	octane					env	cat. B
111-77-3	2-(2-methoxyethoxy)-ethanol	cmr	cat. A				
111-96-6	bis(2-methoxyethyl) ether	cmr	cat. A				
112-24-3	trientine				sen	env	cat. B
112-57-2	3,6,9-triazaundecamethylenediamine				sen	env	cat. B
115-96-8	tris(2-chloroethyl) phosphate	cmr	cat. B			env	cat. B
117-81-7	di(2-ethylhexyl) phthalat (DEHP)	cmr	cat. A			env	cat. A
118-96-7	2,4,6-trinitrotoluene					env	cat. B
119-64-2	1,2,3,4-tetrahydronaphthalene					env	cat. B
120-78-5	di(benzothiazol-2-yl) disulphide				sen	env	cat. B
120-82-1	1,2,4-trichlorobenzene					env	cat. A
121-14-2	2,4-dinitrotoluene	cmr	cat. A	cht		env	cat. B
121-21-1	2-methyl-4-oxo-3-(penta-2,4-dienyl)cyclopent-2-enyl [1R-[1alpha[S*(Z)],3beta]]-chrysanthemate					env	cat. B
121-29-9	2-methyl-4-oxo-3-(penta-2,4-dienyl)cyclopent-2-enyl [1R-[1alpha[S*(Z)](3beta)-3-(3-methoxy-2-methyl-3-oxoprop-1-enyl)-2,2-dimethylcyclopropanecarboxylate					env	cat. B
121-57-3	sulphanilic acid				sen		
121-69-7	N,N-dimethylaniline	cmr	cat. B			env	cat. B
121-75-5	malathion					env	cat. B
122-20-3	1,1',1''-nitrilotripropan-2-ol					env	cat. B
122-39-4	diphenylamine					env	cat. B
122-60-1	2,3-epoxypropyl phenyl ether	cmr	cat. A		sen	env	cat. B
123-30-8	4-aminophenol	cmr	cat. B			env	cat. B
123-31-9	hydroquinone	cmr	cat. B		sen		
123-77-3	C,C'-azodi(formamide)				sen		
123-91-1	1,4-dioxane	cmr	cat. B				
124-68-5	2-amino-2-methylpropanol					env	cat. B
126-73-8	tributyl phosphate	cmr	cat. B				
127-18-4	tetrachloroethene (PER)	cmr	cat. B			env	cat. A
127-19-5	N,N-dimethylacetamide	cmr	cat. A				
127-65-1	tosylchloramide sodium				sen		
127-68-4	sodium 3-nitrobenzenesulphonate				sen		
131-17-9	diallyl phthalate					env	cat. B
133-07-3	N-(trichloromethylthio)phthalimide	cmr	cat. B		sen		
134-62-3	N,N-diethyl-m-toluamide					env	cat. B
135-88-6	N-2-naphthylaniline	cmr	cat. B		sen	env	cat. B
136-23-2	zinc bis(dibutyldithiocarbamate)				sen	env	cat. B
137-26-8	thiram			cht	sen	env	cat. B
137-30-4	ziram			cht	sen	env	cat. B
138-86-3	dipentene				sen	env	cat. B
140-31-8	2-piperazin-1-ylethylamine				sen	env	cat. B
140-66-9	4-(1,1,3,3-tetramethylbutyl)phenol					env	cat. A
140-88-5	ethyl acrylate				sen		
141-32-2	butyl acrylate				sen		
142-59-6	nabam				sen	env	cat. B
142-82-5	heptane					env	cat. B
142-90-5	dodecyl methacrylate					env	cat. B
142-96-1	dibutyl ether					env	cat. B
148-79-8	tiabendazole					env	cat. B
149-30-4	benzothiazole-2-thiol				sen	env	cat. B
149-57-5	2-ethylhexanoic acid	cmr	cat. A				
150-68-5	monuron	cmr	cat. B			env	cat. B
150-76-5	mequinol				sen		
156-43-4	P-phenetidine	cmr	cat. B		sen		
192-97-2	benzo[e]pyrene	cmr	cat. A			env	cat. A
193-39-5	indeno[1,2,3-cd]pyrene					env	cat. A
205-82-3	benzo(j)fluoranthene	cmr	cat. A			env	cat. A
205-99-2	benzo(e)acephenanthrylene	cmr	cat. A			env	cat. A
207-08-9	benzo(k)fluoranthene	cmr	cat. A			env	cat. A
218-01-9	benzo(a)phenanthrene (chrysene)	cmr	cat. A			env	cat. A
287-92-3	cyclopentane					env	cat. B
288-88-0	1,2,4-triazole	cmr	cat. A				
302-01-2	hydrazine	cmr	cat. A		sen	env	cat. B
330-54-1	diuron	cmr	cat. B	cht		env	cat. B
333-41-5	diazinon					env	cat. B
383-07-3	2-propenoic acid, 2-[butyl[(heptadecafluorooctyl)sulphonyl]amino]-ethyl ester					env	cat. A
463-56-9	thiocyanic acid					env	cat. B
463-82-1	neopentane					env	cat. B
533-74-4	dazomet					env	cat. B
540-84-1	2,2,4-trimethylpentane					env	cat. B
541-02-6	decamethylcyclopentasiloxane					env	cat. A
542-75-6	1,3-dichloropropene				sen	env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
548-62-9	[4-[4,4'-bis(dimethylamino)benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride	cmr	cat. B			env	cat. B
552-30-7	1,2,4-tricarboxylic acid 1,2-anhydride benzene				sen		
556-52-5	2,3-epoxypropan-1-ol	cmr	cat. A				
556-67-2	octamethylcyclotetrasiloxane (D4)	cmr	cat. A			env	cat. B
557-20-0	diethylzinc					env	cat. B
569-64-2	[4-[alpha-[4-(dimethylamino)phenyl]benzylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride	cmr	cat. A			env	cat. B
584-79-2	allethrin					env	cat. B
584-84-9	4-methyl-m-phenylene diisocyanate	cmr	cat. B		sen	env	cat. B
592-01-8	calcium cyanide					env	cat. B
606-20-2	2,6-dinitrotoluene	cmr	cat. A	cht		env	cat. B
609-72-3	N,N-dimethyl-o-toluidine					env	cat. B
611-15-4	2-methylstyrene					env	cat. B
625-45-6	methoxyacetic acid	cmr	cat. A				
630-08-0	carbon monoxide	cmr	cat. A	cht			
688-73-3	tri-n-butyltin hydride					env	cat. A
700-13-0	2,3,5-trimethylhydroquinone				sen	env	cat. B
719-86-8	3-acetyl-1-phenyl-pyrrolidine-2,4-dione			cht		env	cat. B
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide			cht	sen	env	cat. B
732-26-3	2,4,6-tri-tert-butylphenol					env	cat. A
818-61-1	2-hydroxyethyl acrylate				sen		
822-06-0	hexamethylene-1,6-diisocy				sen		
842-07-9	1-phenylazo-2-naphthol	cmr	cat. B		sen	env	cat. B
868-77-9	2-hydroxyethyl methacrylate				sen		
917-61-3	sodium cyanate					env	cat. B
923-26-2	2-hydroxypropyl methacrylate				sen		
1070-70-8	1,4-butanediyl diacrylate				sen		
1072-35-1	lead distearate	cmr	cat. A			env	cat. A
1085-98-9	dichlofluanid				sen	env	cat. B
1163-19-5	bis(pentabromophenyl) ether (decaDBE)					env	cat. A
1300-71-6	xylenol					env	cat. B
1303-28-2	diarsenic pentaoxide					env	cat. A
1306-19-0	cadmium oxide	cmr	cat. A	cht		env	cat. A
1306-23-6	cadmium sulphide	cmr	cat. A	cht		env	cat. A
1307-96-6	cobalt oxide				sen	env	cat. B
1308-38-9	chromium (III) oxide					env	cat. A
1309-64-4	diantimony trioxide	cmr	cat. B				
1313-27-5	molybdenum trioxide			cht			
1313-99-1	nickel monoxide	cmr	cat. A		sen	env	cat. B
1314-13-2	zinc oxide					env	cat. B
1314-41-6	orange lead	cmr	cat. A			env	cat. A
1314-62-1	divanadium pentaoxide	cmr	cat. A	cht		env	cat. B
1317-36-8	lead monoxide	cmr	cat. A			env	cat. A
1317-38-0	copper oxide					env	cat. B
1317-39-1	dicopper oxide					env	cat. B
1317-42-6	cobalt sulphide				sen	env	cat. B
1319-46-6	trilead bis(carbonate) dihydroxide	cmr	cat. A			env	cat. A
1327-53-3	diarsenic trioxide					env	cat. A
1333-82-0	chromium trioxide	cmr	cat. A	cht	sen	env	cat. A
1338-02-9	naphthenic acids, copper salts					env	cat. B
1344-37-2	lead sulfochromate yellow	cmr	cat. A			env	cat. A
1344-48-5	mercury(II) sulfide					env	cat. A
1589-47-5	2-methoxypropanol	cmr	cat. A				
1652-63-7	1-propanaminium, 3-[[(heptadecafluorooctyl)sulphonyl]amino]-N,N,N-trimethyl-, iodide					env	cat. A
1663-39-4	tert-butyl acrylate				sen	env	cat. B
1675-54-3	2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane				sen		
1680-21-3	1,2-ethanediylbis(oxy-2,1-ethanediyl) diacrylate				sen		
1691-99-2	N-ethylheptadecafluoro-N-(2-hydroxyethyl)octanesulphonamide					env	cat. A
1717-00-6	1,1-dichloro-1-fluoroethane					env	cat. B
1897-45-6	chlorothalonil	cmr	cat. B		sen	env	cat. B
1918-00-9	dicamba					env	cat. B
1939-36-2	N,N'-propylene-1,3-diylbis[N-(hydroxycarbonylmethyl)glycine]					env	cat. B
2051-79-8	N5,N5-diethyltoluene-2,5-diamine monohydrochloride				sen	env	cat. B
2155-70-6	tributyl(methacryloyloxy)stannane					env	cat. A
2210-79-9	2,3-epoxypropyl o-tolyl ether	cmr	cat. B		sen	env	cat. B
2223-82-7	2,2-dimethyl-1,3-propanediyl diacrylate				sen		
2425-79-8	1,4-bis(2,3-epoxypropoxy)butane				sen		
2426-08-6	butyl 2,3-epoxypropyl ether	cmr	cat. B		sen	env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
2451-62-9	1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione	cmr	cat. A	cht	sen	env	cat. B
2634-33-5	1,2-benzisothiazol-3(2H)-one				sen		
2687-94-7	N-(n-octyl)-2-pyrrolidinone					env	cat. B
2687-96-9	N-(n-dodecyl)pyrrolidinone				sen	env	cat. B
2699-79-8	sulphuryl difluoride			cht			
2795-39-3	potassium heptadecafluorooctane-1-sulphonate	cmr	cat. A	cht		env	cat. A
2855-13-2	3-aminomethyl-3,5,5-trimethylcyclohexylamine				sen	env	cat. B
2867-47-2	2-dimethylaminoethyl methacrylate				sen		
2893-78-9	troclosene sodium					env	cat. B
2921-88-2	chlorpyrifos					env	cat. B
2991-51-7	glycine, N-ethyl-N-[(heptadecafluorooctyl)sulphonyl]-, potassium salt					env	cat. A
2997-92-4	2,2'-azobis[2-methylpropionamidine] dihydrochloride				sen		
3194-55-6	1,2,5,6,9,10-hexabromocyclododecane					env	cat. A
3333-67-3	nickel carbonate	cmr	cat. B		sen	env	cat. B
3347-22-6	dithianon					env	cat. B
3380-34-5	triclosan					env	cat. B
3457-61-2	tert-butyl alpha,alpha-dimethylbenzyl peroxide					env	cat. B
3508-98-3	2-phenylhexanenitrile					env	cat. B
3524-68-3	2-(hydroxymethyl)-2-[[(1-oxoallyl)oxy]methyl]-1,3-propanediyl diacrylate				sen		
3811-04-9	potassium chlorate					env	cat. B
3825-26-1	ammonium pentadecafluorooctanoate	cmr	cat. A	cht		env	cat. A
4067-16-7	3,6,9,12-tetraazatetradecamethylenediamine				sen	env	cat. B
4074-88-8	diethylene glycol acrylate				sen		
4083-64-1	P-toluenesulphonyl isocyanate				sen		
4098-71-9	3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate				sen	env	cat. B
4524-95-2	2-methyl-2-azabicyclo[2.2.1]heptane			cht			
4719-04-4	2,2',2''-(hexahydro-1,3,5-triazine-1,3,5-triyl)triethanol				sen		
4986-89-4	2,2-bis[[(1-oxoallyl)oxy]methyl]-1,3-propanediyl diacrylate				sen		
5124-30-1	4,4'-methylenedicyclohexyl diisocyanate				sen		
5329-14-6	sulphamidic acid					env	cat. B
5392-40-5	citral				sen		
5470-11-1	hydroxylammonium chloride			cht	sen		
5836-29-3	coumatetralyl			cht		env	cat. B
5873-54-1	O-(p-isocyanatobenzyl)phenyl isocyanate				sen		
5989-27-5	(R)-p-mentha-1,8-diene				sen	env	cat. B
5989-54-8	(S)-p-mentha-1,8-diene				sen	env	cat. B
6317-18-6	methylene dithiocyanate				sen		
6864-37-5	2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)					env	cat. B
6876-12-6	trans-1-methyl-4-(1-methylvinyl)cyclohexene				sen	env	cat. B
7085-85-0	ethyl 2-cyanoacrylate				sen		
7439-92-1	lead	cmr	cat. B			env	cat. A
7439-97-6	mercury					env	cat. A
7440-02-0	nickel carbonate	cmr	cat. B		sen		
7440-38-2	arsenic					env	cat. A
7440-41-7	beryllium	cmr	cat. A	cht	sen		
7440-43-9	cadmium	cmr	cat. A			env	cat. A
7440-48-4	cobalt				sen	env	cat. B
7440-66-6	zinc					env	cat. B
7446-14-2	lead sulphate	cmr	cat. A			env	cat. A
7446-19-7	zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); zinc sulphate (anhydrous)					env	cat. B
7447-39-4	copper dichloride					env	cat. B
7646-79-9	cobalt dichloride	cmr	cat. A		sen	env	cat. B
7646-85-7	zinc chloride					env	cat. B
7705-14-8	(±)-1-methyl-4-(1-methylvinyl)cyclohexene				sen	env	cat. B
7718-54-9	nickel dichloride	cmr	cat. A		sen	env	cat. B
7722-64-7	potassium permanganate					env	cat. B
7723-14-0	phosphorus (red)					env	cat. B
7727-21-1	dipotassium peroxodisulphate				sen		
7727-54-0	diammonium peroxodisulphate				sen		
7733-02-0	zinc sulphate					env	cat. B
7758-89-6	copper chloride					env	cat. B
7758-95-4	lead dichloride	cmr	cat. A			env	cat. A
7758-97-6	lead chromate	cmr	cat. A			env	cat. A
7758-98-7	copper sulphate					env	cat. B
7761-88-8	silver nitrate					env	cat. B
7775-09-9	sodium chlorate					env	cat. B
7778-50-9	potassium dichromate	cmr	cat. A	cht	sen	env	cat. A
7779-90-0	trizinc bis(orthophosphate)					env	cat. B
7782-49-2	selenium					env	cat. B
7785-87-7	manganese sulphate			cht		env	cat. B
7786-81-4	nickel sulphate	cmr	cat. B		sen	env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
7789-06-2	strontium chromate	cmr	cat. B			env	cat. B
7789-12-0	sodium dichromate, dihydrate	cmr	cat. A	cht	sen	env	cat. A
7803-49-8	hydroxylamine			cht	sen		
8001-58-9	creosote	cmr	cat. A				
8002-05-9	petroleum	cmr	cat. B				
8006-64-2	turpentine, oil				sen	env	cat. B
8007-45-2	tar, coal	cmr	cat. A				
8050-09-7	rosin				sen		
8052-10-6	tall-oil rosin				sen		
9000-90-2	alpha-amylase				sen		
9002-93-1	alfa-(4-(1,1,3,3-tetramethylbuthyl)phenyl)-omega-hydroxy-poly(oxy-1,2-ethandiyl)					env	cat. A
9004-87-9	alfa-(isooctylphenyl)-omega-hydroxy-poly(oxy-1,2-ethandiyl)					env	cat. A
9012-54-8	cellulase				sen		
9014-01-1	subtilisin				sen		
9014-90-8	.alpha.-sulfo-.omega.-(nonylphenoxy)-poly(oxy-1,2-ethanediyl), sodium salt					env	cat. A
9016-45-9	nonylphenol, ethoxylated					env	cat. A
9036-19-5	octylphenoxy polyethoxyethanol					env	cat. A
9040-65-7	formaldehyde, polymere with nonylphenol					env	cat. A
9051-57-4	alfa-sulfo-omega-(nonylphenoxy)-poly(oxy-1,2-ethanediyl), ammonium salt					env	cat. A
9063-89-2	alpha-(octylphenyl)-omega-hydroxy-poly(oxy-1,2-ethanediyl)					env	cat. A
10039-54-0	bis(hydroxylammonium) sulphate			cht	sen		
10046-00-1	hydroxylammonium hydrogensulphate			cht	sen		
10061-01-5	(Z)-1,3-dichloropropene				sen	env	cat. B
10102-18-8	sodium selenite				sen	env	cat. B
10124-36-4	cadmium sulphate	cmr	cat. A	cht		env	cat. A
10124-43-3	cobalt sulphate	cmr	cat. A		sen	env	cat. B
10294-40-3	barium chromate					env	cat. A
10588-01-9	sodium dichromate	cmr	cat. A	cht	sen	env	cat. A
10605-21-7	carbendazim	cmr	cat. A			env	cat. B
11070-44-3	tetrahydromethylphthalic anhydride				sen		
12035-72-2	trinickel disulphide	cmr	cat. A		sen	env	cat. B
12069-69-1	copper(II) carbonate--copper(II) hydroxide (1:1)					env	cat. B
12122-67-7	zineb				sen		
12141-20-7	trilead dioxide phosphonate	cmr	cat. A			env	cat. A
12656-85-8	lead chromate molybdate sulfate red	cmr	cat. A			env	cat. A
13048-33-4	hexamethylene diacrylate				sen		
13516-27-3	guazatine					env	cat. B
13530-65-9	zinc chromate	cmr	cat. A		sen	env	cat. A
13775-53-6	trisodium hexafluoroaluminate			cht		env	cat. B
14324-55-1	zinc bis(diethyldithiocarbamate)				sen	env	cat. B
14650-24-9	2-[[(heptadecafluorooctyl)sulphonyl]methyl-amino]ethyl methacrylate					env	cat. A
14816-18-3	phoxim					env	cat. B
15096-52-3	trisodium hexafluoroaluminate (cryolite)			cht		env	cat. B
15625-89-5	2-ethyl-2-[[(1-oxoallyl)oxy]methyl]-1,3-propanediyl diacrylate				sen		
16298-38-7	4,4'-methylenebis(2-isopropyl-6-methylaniline)			cht		env	cat. B
16484-77-8	(R)-2-(4-chloro-2-methylphenoxy)propionic acid					env	cat. B
17557-23-2	1,3-bis(2,3-epoxypropoxy)-2,2-dimethylpropane				sen		
17570-76-2	lead(II) methanesulfonate	cmr	cat. A	cht		env	cat. A
17865-32-6	cyclohexyldimethoxymethylsilane					env	cat. B
19247-05-3	N-amino-N-carboxymethylglycine			cht	sen	env	cat. B
19900-65-3	4,4'-methylenebis(2-ethylaniline)	cmr	cat. B			env	cat. B
21087-64-9	metribuzin					env	cat. B
21564-17-0	(benzothiazol-2-ylthio)methyl thiocyanate				sen	env	cat. B
23783-26-8	hydroxyphosphonoacetic acid			cht	sen		
25057-89-0	bentazone				sen	env	cat. B
25068-38-6	4,4'-isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane (Bisphenol-A and epoxy resin)				sen	env	cat. B
25154-52-3	nonylphenol	cmr	cat. A			env	cat. A
25321-14-6	dinitrotoluene	cmr	cat. A	cht		env	cat. B
25376-45-8	diaminotoluene	cmr	cat. A		sen	env	cat. B
25402-06-6	3-(but-2-enyl)-2-methyl-4-oxocyclopent-2-enyl 2,2-dimethyl-3-(2-methylprop-1-enyl)cyclopropanecarboxylate					env	cat. B
25550-51-0	hexahydromethylphthalic anhydride				sen		
25584-83-2	acrylic acid, monoester with propane-1,2-diol				sen		
25637-99-4	hexabromocyclododecane					env	cat. A
25646-71-3	N-(2-(4-amino-N-ethyl-m-toluidino)ethyl)methanesulphonamide sesquisulphate				sen	env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
25646-77-9	(4-ammonio-m-tolyl)ethyl(2-hydroxyethyl)ammonium sulphate			cht	sen	env	cat. B
26027-38-3	4-nonylphenol, ethoxylated					env	cat. A
26354-18-7	poly(methylmethacrylate, tributyltin methacrylate)					env	cat. A
26401-47-8	poly(oxy-1,2-ethanediyl), alpha-(4-dodecylphenyl)-omega-hydroxy-					env	cat. A
26447-14-3	[(tolyloxy)methyl]oxirane	cmr	cat. B		sen	env	cat. B
26447-40-5	methylenediphenyl diisocyanate				sen		
26471-62-5	M-tolylidene diisocyanate	cmr	cat. B		sen	env	cat. B
26530-20-1	2-octyl-2H-isothiazol-3-one				sen	env	cat. B
26590-20-5	1,2,3,6-tetrahydromethylphthalic anhydride				sen		
26635-64-3	isooctane					env	cat. B
27177-03-3	20-(nonylphenoxy)-3,6,9,12,15,18-hexaoxaicosan-1-ol					env	cat. A
27177-05-5	23-(nonylphenoxy)-3,6,9,12,15,18,21-heptaoxatricosan-1-ol					env	cat. A
27177-08-8	29-(nonylphenoxy)-3,6,9,12,15,18,21,24,27-nonaoxanonacosanol					env	cat. A
27193-86-8	dodecylphenol					env	cat. A
28434-00-6	3-allyl-2-methyl-4-oxocyclopent-2-en-1-yl [1R-[1alpha(S*),3beta]]-2,2-dimethyl-3-(2-methylprop-1-enyl)cyclopropanecarboxylate (S-bioallethrin)					env	cat. B
28434-01-7	bioresmethrin					env	cat. B
29081-56-9	ammonium heptadecafluorooctanesulphonate	cmr	cat. A	cht		env	cat. A
31394-54-4	isoheptane					env	cat. B
33813-20-6	5,6-dihydro-3H-imidazo(2,1-c)-1,2,4-dithiazole-3-thione					env	cat. B
34123-59-6	3-(4-isopropylphenyl)-1,1-dimethylurea	cmr	cat. B			env	cat. B
36669-85-9	calcium P,P'-(1-hydroxyethylene)bis(hydrogen phosphonate)dihydrate					env	cat. B
37205-87-1	alpha-(isononylphenyl)-omega-hydroxy-poly (oxy-1,2-ethanediyl)					env	cat. A
37300-23-5	potassium zinc chromat	cmr	cat. A			env	cat. A
37441-29-5	5-amino-2,4,6-triiodo-1,3-benzenedicarbonyldichloride				sen	env	cat. B
39515-41-8	alpha-cyano-3-phenoxybenzyl 2,2,3,3-tetramethylcyclopropanecarboxylate					env	cat. B
42978-66-5	(1-methyl-1,2-ethanediyl)bis[oxy(methyl-2,1-ethanediyl)] diacrylate				sen	env	cat. B
51580-86-0	troclosene sodium, dihydrate					env	cat. B
51811-79-1	polyoxyethylene octadecylphenol (ethoxylated nonylphenol phosphate)					env	cat. A
52315-07-8	alpha-cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate					env	cat. B
52623-95-7	poly(oxy-1,2-ethanediyl), alpha-((1.1.3.3.-tetramethyl-butyl)phenyl)-omega-hydroxy-phosphate					env	cat. A
52645-53-1	M-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate				sen	env	cat. B
52918-63-5	alpha-cyano-3-phenoxybenzyl [1R-[1alpha(S*),3alpha]]-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate					env	cat. B
53408-94-9	tin (II) methane sulphonate				sen		
55512-33-9	O-(6-chloro-3-phenylpyridazin-4-yl) S-octyl thiocarbonate (pyridate)				sen	env	cat. B
55965-84-9	Mixture of: 5-chloro-2-methyl-4-isothiazolin-3-one [EC no. 247-500-7] and 2-methyl-2H -isothiazol-3-one [EC no. 220-239-6] (3:1); Mixture of: 5-chloro-2-methyl-4-isothiazolin-3-one [EC no. 247-500-7] and 2-methyl-4-isothiazolin-3-one [EC no. 220-239-6] (3:1)				sen	env	cat. B
56073-10-0	4-hydroxy-3-(3-(4'-bromo-4-biphenylyl)-1,2,3,4-tetrahydro-1-naphthyl)coumarin			cht		env	cat. B
56773-42-3	tetraethylammonium heptadecafluorooctanesulphonate					env	cat. A
56973-87-6	1-(3,3-dimethylcyclohexyl)pent-4-en-1-one					env	cat. B
57280-22-5	4,4-dimethyl-3,5,8-trioxabicyclo[5.1.0]octane				sen		
58594-72-2	1-[2-(allyloxy)ethyl-2-(2,4-dichlorophenyl)-1H-imidazolium hydrogen sulphate				sen	env	cat. B
59227-88-2	1-octylazepin-2-one				sen	env	cat. B
59653-74-6	1,3,5-tris-[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione	cmr	cat. A	cht	sen		
60207-90-1	1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (propiconazol)				sen	env	cat. B
60864-33-7	poly(oxy-1,2-ethanediyl), alpha-(phenylmethyl)-omega-((1.1.3.3.-tetramethyl-butyl)-phenoxy)					env	cat. A
61789-28-4	creosote oil	cmr	cat. A				
61789-80-8	quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, chlorides (DHTDMAC)					env	cat. A
61790-14-5	naphthenic acids, lead salts	cmr	cat. A			env	cat. A
64741-45-3	residues (petroleum), atm. tower	cmr	cat. A				
64741-53-3	distillates (petroleum), heavy naphthenic	cmr	cat. A				
64741-57-7	gas oils (petroleum), heavy vacuum	cmr	cat. A				

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
64741-59-9	distillates (petroleum), light catalytic cracked	cmr	cat. A				
64741-60-2	distillates (petroleum), intermediate catalytic cracked	cmr	cat. A				
64741-67-9	residues (petroleum), catalytic reformer fractionator	cmr	cat. A				
64741-80-6	residues (petroleum), thermal cracked	cmr	cat. A				
64741-82-8	distillates (petroleum), light thermal cracked	cmr	cat. A				
64742-04-7	extracts (petroleum), heavy paraffinic distillate solvent	cmr	cat. A				
64742-11-6	extracts (petroleum), heavy naphthenic distillate solvent	cmr	cat. A				
64742-21-8	distillates (petroleum), acid-treated light paraffinic	cmr	cat. A				
64742-90-1	residues (petroleum), steam-cracked	cmr	cat. A				
65996-89-6	tar, coal, high-temp.	cmr	cat. A				
65996-93-2	pitch, coal tar, high-temp.	cmr	cat. A			env	cat. B
66197-78-2	26-(nonylphenoxy)-3,6,9,12,15,18,21,24-octaoxahexacosan-1-yl dihydrogen phosphate					env	cat. A
67375-30-8	alpha-cypermethrin			cht		env	cat. B
67485-29-4	5,5-dimethyl-perhydro-pyrimidin-2-one alpha-(4-trifluoromethylstyryl)-alpha-(4-trifluoromethyl)cinnamylidenehydrazone			cht		env	cat. B
67564-91-4	cis-4-[3-(p-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine	cmr	cat. A			env	cat. B
68131-73-7	polyethylenepolyamines				sen	env	cat. B
68334-30-5	fuels, diesel	cmr	cat. B				
68412-53-3	nonylphenol ethoxylate (EO9) phosphate ester					env	cat. A
68412-54-4	alpha -(nonylphenyl)-omega- hydroxy-poly (oxy-1,2-ethanediyl), branched (Nonylphenol, branched, ethoxylated)					env	cat. A
68476-30-2	fuel oil, no. -2	cmr	cat. B				
68476-33-5	fuel oil, residual	cmr	cat. A				
68476-34-6	fuels, diesel, no. -2	cmr	cat. B				
68479-98-1	diethylmethylbenzenediamine			cht		env	cat. B
68515-42-4	1,2-benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters	cmr	cat. A				
68607-30-7	residues (petroleum), topping plant, low-sulfur	cmr	cat. A				
68609-97-2	oxirane, mono[(C12-14-alkyloxy)methyl] derivs.				sen		
68783-08-4	gas oils (petroleum), heavy atmospheric	cmr	cat. A				
68783-78-8	quaternary ammonium compounds, dimethylditallow alkyl, chlorides (DTDMAC)					env	cat. A
68891-21-4	alpha-(dinonylphenyl)-omega-hydroxy-poly(oxy-1,2-ethanediyl), branched					env	cat. A
68955-36-2	residues (petroleum), steam-cracked, resinous	cmr	cat. A				
68987-90-6	alpha-(octylphenyl)-omega-hydroxy-poly(oxy-1,2-ethanediyl), branched					env	cat. A
69011-84-3	alpha-sulpho-omega-(octylphenyl)-poly(oxy-1,2-ethanediyl), branched, sodium salt					env	cat. A
70225-14-8	1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulphonic acid, compd. with 2,2'-iminobi					env	cat. A
70657-70-4	2-methoxypropyl acetate	cmr	cat. A				
71868-10-5	2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one					env	cat. B
73138-82-6	resin acids and rosin acids				sen		
74223-64-6	metsulfuron-methyl; 2-(4-methoxy-6-methyl-1,3,5-triazin-2-ylcarbamoylsulfamoyl) benzoic acid					env	cat. B
75490-39-0	2,2,4-trimethyl-4-phenyl-butane-nitrile					env	cat. B
78587-05-0	hexythiazox; trans-5-(4-chlorophenyl)-N-cyclohexyl-4-methyl-2-oxo-3-thiazolidine-carboxamide					env	cat. B
79881-89-3	3'-(3-Acetyl-4-hydroxyphenyl)-1,1- diethylurea			cht			
80657-64-3	A mixture of: ethyl exo-tricyclo[5.2.1.0.su.2,6.su.]decane-endo-2-carboxylate and ethyl-endo-tricyclo[5.2.1.0.su.2,6.su.]decane-exo-2-carboxylate					env	cat. B
82633-79-2	2,3,5,6-tetrahydro-2-methyl-2H-cyclopenta[d]-1,2-thiazol-3-one				sen	env	cat. B
83016-70-0	2-[(2-[2-(dimethylamino)ethoxy]ethyl)methylamino]ethanol					env	cat. B
84057-97-6	sodium 1-amino-4-[2-methyl-5-(4-methylphenylsulfonylamino)phenylamino]anthraquinone-2-sulfonate					env	cat. B
84852-15-3	phenol, 4-nonyl-, branched	cmr	cat. A			env	cat. A
85153-92-0	hexasodium 6,13-dichloro-3,10-bis((4-(2,5-disulfonatoanilino)-6-fluoro-1,3,5-triazin-2-ylamino)prop-3-ylamino)-5,12-dioxa-7,14-diazapentacene-4,11-disulfonate				sen		
85535-84-8	alkanes, C10-13, chloro	cmr	cat. B			env	cat. A
85535-85-9	alkanes, C14-17, chloro					env	cat. A
85954-11-6	2,2'-((3,3',5,5'-tetramethyl-(1,1'-biphenyl)-4,4'-diyl)-bis(oxymethylene))-bis-oxirane	cmr	cat. B				
87731-18-8	cyclooct-4-en-1-yl methyl carbonate				sen		

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
89415-87-2	1,3-dichloro-5-ethyl-5-methylimidazolidine-2,4-dione				sen		
90640-80-5	anthracene oil					env	cat. A
90640-82-7	anthracene oil, anthracenelow					env	cat. A
90640-84-9	creosote oil, acenaphthene fraction	cmr	cat. A				
90640-86-1	distillates (coal tar), heavy oils	cmr	cat. A			env	cat. A
91273-04-0	1-(N,N-bis(2-ethylhexyl)aminomethyl)-1,2,4-triazole				sen	env	cat. B
91465-08-6	lambda-cyhalotrin (A 1:1 mixture of (S)-alpha-cyano-3-phenoxybenzyl(Z)-(1R)-cis-3-(2-chloro-3,3,3-trifluoropropenyl)-2,2-dimethylcyclopropanecarboxylate and (R)-alpha-cyano-3-phenoxybenzyl (Z)-(1S)-cis-3-(2-chloro-3,3,3-trifluoropropenyl)-2,2-dimethylcyclopropanecarboxylate)					env	cat. B
91673-30-2	formaldehyde, reaction products with butylphenol				sen		
92045-29-9	gas oils (petroleum), thermal-cracked, hydrodesulfurized	cmr	cat. A				
95154-01-1	(benzothiazol-2-ylthio)succinic acid				sen		
103694-68-4	3-(2,2-dimethyl-3-hydroxypropyl)toluene					env	cat. B
106264-79-3	6-methyl-2,4-bis(methylthio)phenylene-1,3-diamine				sen	env	cat. B
106990-43-6	N,N',N'',N'''-tetrakis(4,6-bis(butyl-(N-methyl-2,2,6,6-tetramethylpiperidin-4-yl)amino)triazin-2-yl)-4,7-diazadecane-1,10-diamine				sen	env	cat. B
107534-96-3	1-(4-chlorophenyl)-4,4-dimethyl-3-(1,2,4-triazol-1-ylmethyl)pentan-3-ol	cmr	cat. A			env	cat. B
107898-54-4	(+/-) trans-3,3-dimethyl-5-(2,2,3-trimethyl-cyclopent-3-en-1-yl)pent-4-en-2-ol					env	cat. B
108624-00-6	lithium sodium hydrogen 4-amino-6-(5-(5-chloro-2,6-difluoropyrimidin-4-ylamino)-2-sulfonatophenylazo)-5-hydroxy-3-(4-(2-(sulfonatooxy)ethylsulfonyl)phenylazo)naphthalene-2,7-disulfonate				sen		
109909-39-9	poly(oxy-1,2-ethanediyl), alpha-sulfo-omega-(2,4,6-tris(1-methylpropyl)phenoxy)-, sodium salt					env	cat. A
111337-53-2	lithium 3-oxo-1,2(2H)-benzisothiazol-2-ide				sen	env	cat. B
111687-36-6	ammonium iron(III) trimethylenediaminetetraacetate hemihydrate					env	cat. B
116889-78-2	tetrasodium 4-amino-5-hydroxy-6-(3-(2-(2-(sulfonatooxy)ethylsulfonyl)ethylcarbamoyl)phenylazo)-3-(4-(2-(sulfonatooxy)ethylsulfonyl)phenylazo)naphthalene-2,7-disulfonate				sen		
117527-94-3	A mixture of: tert-alkyl(C12-C14)ammonium bis[1-[(2-hydroxy-5-nitrophenyl)azo]-2-naphthalenolato(2-)]-chromate(1-), tert-alkyl(C12-C14)ammonium bis[1-[(2-hydroxy-4-nitrophenyl)azo]-2-naphthalenolato(2-)]-chromate(1-), tert-alkyl(C12-C14)ammonium bis[1-[[5-(1,1-dimethylpropyl)-2-hydroxy-3-nitrophenyl]azo]-2-naphthalenolato(2-)]-chromate(1-), tert-alkyl(C12-C14)ammonium [[1-[(2-hydroxy-5-nitrophenyl)azo]-2-naphthalenolato(2-)]-[1-[(2-hydroxy-5-nitrophenyl)azo]-2-naphthalenolato(2-)]]-chromate(1-), tert-alkyl(C12-C14)ammonium [[1-[[5-(1,1-dimethylpropyl)-2-hydroxy-3-nitrophenyl]azo]-2-naphthalenolato(2-)]-[1-[(2-hydroxy-5-nitrophenyl)azo]-2-naphthalenolato(2-)]]-chromate(1-), tert-alkyl(C12-C14)ammonium ((1-(4(or 5)-nitro-2-oxidophenylazo)-2-naphtholato)(1-(3-nitro-2-oxido-5-pentylphenylazo)-2-naphtholato))chromate(1-)					env	cat. B
119313-12-1	2-benzyl-2-dimethylamino-4'-morpholinobutyrophenone					env	cat. B
121158-58-5	dodecyl-phenol, branched					env	cat. A
121575-60-8	pitch, coal tar, high-temp., heat-treated	cmr	cat. A				
122070-78-4	phenanthrene, distn. residues	cmr	cat. A				
122760-84-3	4-methyl-8-methylenetricyclo[3.3.1.13,7]decan-2-ol				sen	env	cat. B
124605-82-9	tetra-sodium/lithium 4,4'-bis-(8-amino-3,6-disulfonato-1-naphthol-2-ylazo)-3-methylazobenzene				sen	env	cat. B
125109-85-5	beta-methyl-3-(1-methylethyl)benzenepropanal					env	cat. B
125229-74-5	copolymer of vinyl-alcohol and vinyl acetate partially acetilized with 4-(2-(4-formylphenyl)ethenyl)-1-methylpyridinium methylsulfate					env	cat. B
126833-17-8	N-(2,3-dichloro-4-hydroxyphenyl)-1-methylcyclohexanecarboxamide					env	cat. B
127087-87-0	4-nonylphenol, branched, ethoxylated					env	cat. A
127519-17-9	A mixture of branched and linear C7-C9 alkyl 3-[3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxyphenyl]propionates					env	cat. B
129050-62-0	trisodium N,N-bis(carboxymethyl)-beta-alanine					env	cat. B
136213-71-3	trisodium 5-amino-3-[5-(2-bromoacryloylamino)-2-sulfonatophenylazo]-4-hydroxy-6-(4-vinylsulfonylphenylazo)naphthalene-2,7-disulfonate					env	cat. B

		Hazard category					
		CMR	CMR Weight	CHT	SEN	ENV	ENV Weight
139504-68-0	1-[(2-tert-butylcyclohexyl)oxy]butan-2-ol					env	cat. B
140921-24-0	1,6-hexanediyl-bis(2-(2-(1-ethylpentyl)-3-oxazolidinyl)ethyl)carbamate				sen		
141517-21-7	trifloxystrobin (ISO); (E,E)-alpha-methoxyimino-{2-[[[[1-[3-(trifluoromethyl)phenyl]ethylidene]amino]oxy]methyl]benzeneacetic acid methyl ester				sen	env	cat. B
141773-73-1	2-(1-(3',3'-dimethyl-1'-cyclohexyl)ethoxy)-2-methyl propyl propanoate					env	cat. B
143683-23-2	tetrasodium-1,2-bis(4-fluoro-6-[5-(1-amino-2-sulfonatoanthrachinon-4-ylamino)-2,4,6-trimethyl-3-sulfonatophenylamino]-1,3,5-triazin-2-ylamino)ethane				sen	env	cat. B
143860-04-2	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	cmr	cat. A			env	cat. B
145052-34-2	bis(2,6-dimethoxybenzoyl)-2,4,4-trimethylpentylphosphinoxide				sen	env	cat. B
146177-84-6	sodium 2-(4-(4-fluoro-6-(2-sulfoethylamino)-[1,3,5]triazin-2-ylamino)-2-ureidophenylazo)-5-(4-sulfophenylazo)benzene-1-sulfonate				sen		
149626-00-6	lithium sodium (2-(((5-((2,5-dichlorophenyl)azo)-2-hydroxyphenyl)methylene)amino)benzoato(2-))(2-((4,5-dihydro-3-methyl-5-oxo-1-phenyl-1H-pyrazol-4-yl)azo)-5-sulfobenzoato(3-)) chromate(2-)					env	cat. B
149850-31-7	sodium 1,2-bis[4-[4-{4-(4-sulfophenylazo)-2-sulfophenylazo}-2-ureido-phenyl-amino]-6-fluoro-1,3,5-triazin-2-ylamino]propane, sodium salt				sen		
151006-59-6	A mixture of: branched triacontane, branched dotriacontane, branched tetratriacontane and branched hexatriacontane					env	cat. B
156738-27-1	sodium 4-[4-(4-hydroxyphenylazo)phenylamino]-3-nitrobenzenesulfonate				sen	env	cat. B
161935-19-9	4-[4-amino-5-hydroxy-3-(4-(2-sulfoxyethylsulfonyl)phenylazo)-2,7-disulfonapht-6-ylazo]-6-[3-(4-amino-5-hydroxy-3-(4-(2-sulfoxyethylsulfonyl)phenylazo)-2,7-disulfonapht-6-ylazo]phenylcarbonylamino]benzenesulfonic acid, x sodium salt				sen		
162881-26-7	phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide				sen	env	cat. B
171090-93-0	A mixture of: esters of C14-C15 branched alcohols with 3,5-di-t-butyl-4-hydroxyphenyl propionic acid, C15 branched and linear alkyl 3,5-bis(1,1-dimethylethyl)-4-hydroxybenzenepropanoate and C13 branched and linear alkyl 3,5-bis(1,1-dimethylethyl)-4-hydroxybenzenepropanoate					env	cat. B
171599-85-2	N,N'-bis{6-chloro-4-[6-(4-vinylsulfonylphenylazo)-2,7-disulfonicacid 5-hydroxy-napht-4-ylamino]-1,3,5-triazin-2-yl}-N-(2-hydroxyethyl)-ethane-1,2-diamine, sodium salt				sen		

A3. Standard Industrial Classification (SIC2002/NACE) (Statistics Norway 2002)

NACE	Title
1	Agriculture, hunting and related service activities
2	Forestry, logging and related service activities
5	Fishing, fish farming and related service activities
10	Mining of coal and lignite, extraction of peat
11	Extraction of crude petroleum and natural gas, service activities incidental to oil and gas extraction excluding surveying
12	Mining of uranium and thorium ores
13	Mining of metal ores
14	Other mining and quarrying
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel, dressing and dyeing of fur
19	Tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture, manufacturing n.e.c.
37	Recycling
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
45	Construction
50	Sale, maintenance and repair of motor vehicles and motorcycles, retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles. Repair of personal and household goods
55	Hotels and restaurants
60	Land transport. transport via pipelines
61	Water transport
62	Air transport
63	Supporting and auxiliary transport activities, activities of travel agencies
64	Post and telecommunications
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
70	Real estate activities
71	Renting of machinery and equipment without operator and of personal and household goods
72	Computers and related activities
73	Research and development
74	Other business activities
75	Public administration and defence, compulsory social security
80	Education
85	Health and social work
90	Sewage and refuse disposal, sanitation and similar activities
91	Activities of membership organizations n.e.c.
92	Recreational, cultural and sporting activities
93	Other service activities
95	Activities of households with employed persons
99	Extra-territorial organizations and bodies

A4. Use Code Nordic (UCN)

UCN are product types developed by the Nordic Product Register Group – a subgroup under the Nordic Chemical Group – Nordic Council of Ministers (Product Register 2007)

Product code (UCN)	Product type
A05	**Absorbents and adsorbents**
A05100	Filtration materials
A05200	Filtration media
A05250	Ion exchanger
A05300	Air cleaners and anti-odour agents (not filters)
A05400	Other absorbents and adsorbents
A20	**Anti-scaling agents**
A20100	Anti-scaling agents
A25	**Anti-set-off agents**
A25100	Anti-set-off agents
A40	**Anti-freezing agents**
A40100	De-icing agents
A40200	Cooling agents
A40300	Other anti-freezing agents
A45	**Anti-clotting agents**
A45100	Anti-clotting agents
A50	**Anti-tack agents**
A50100	Anti-tack agents
A55	**Anti-static agents**
A55100	Anti-static agents
A60	**Dressing agents**
A60100	Dressing agents (glazing agents, polishing agents)
B15	**Biocides**
B15110	Human hygiene biocidal products (PT1)
B15120	Private area and public health area disinfectants and other biocidal products (PT2)
B15130	Veterinary hygiene biocidal products (PT3)
B15140	Food and feed area disinfectants (PT4)
B15142	Sanitation agents for toilets
B15150	Drinking water disinfectants (PT5)
B15310	In-can preservatives (PT6)
B15315	Wood preservatives (PT8)
B15320	Film preservatives (PT7)
B15330	Fibre, leather, rubber and polymerised materials preservatives (PT9)
B15340	Masonry preservatives (PT10)
B15350	Preservatives for liquid-cooling and processing systems (PT11)
B15360	Slimicides (PT12)
B15370	Metalworking-fluid preservatives (PT13)
B15510	Rodenticides (PT14)
B15520	Avicides (PT15)
B15530	Molluscicides (PT16)
B15540	Piscicides (PT17)
B15550	Insecticides, acaricides and products to control other arthropods (PT18)
B15560	Repellents and attractants (PT19)
B15710	Preservatives for food or feedstock (PT20)
B15720	Antifouling (PT21)
B15730	Embalming and taxidermist fluids (PT22)
B15740	Control of other vertebrates (PT23)
B16	**Plant protection**
B16110	Insecticides
B16120	Fungicides
B16130	Herbicides (weed killers)
B16140	Growth inhibitors
B16150	Soil disinfection agents
B16190	Other plant protection products
B18	**Car care products**
B18100	Car care products
B20	**Binding agents**
B20100	Binding agents for paints, adhesives etc
B20200	Binding agents for moulding sand
B20300	Other binding agents

Product code (UCN)	Product type
B25	**Bleaching agents**
B25200	Bleaching agents for textiles
B25300	Other bleaching agents
B30	**Blasting agents**
B30100	Blasting agents (sandblasting agents)
B35	**Softeners**
B35100	Softeners for plastic, rubber, paint and adhesive
B35200	Softeners - Softeners not included in B35100
B45	**Flame retardants**
B45100	Flame retardants
B50	**Fire extinguishing agents**
B50100	Fire extinguishing agents
B55	**Fuels**
B55100	Motor fuels
B55150	Ignition gas
B55200	Heating fuels
B55300	Other fuels
B60	**Fuel additives**
B60100	Anti-knocking agents
B60200	Other fuel additives
B65	**Deposit inhibitors**
B65100	Deposit inhibitors
D05	**Denaturing agents**
D05100	Denaturing agents
D15	**Propellants**
D15100	Propellants
D20	**Odour agents**
D20100	Industry perfumes - (odorants)
D20200	Deodorants - Chemicals and products that not are cosmetic products
D20300	Other odour agents
D25	**Dental products**
D25100	Dental products
E03	**Expanding products**
E03100	Expanding products
E05	**Extraction agents**
E05100	Extraction agents
E07	**Electric and electromechanical components**
E07100	Semiconductors
E07200	Commutators and materials for commutators
E07300	Conductive materials
E07400	Dielectrics
E07500	Transformers and materials for transformers
E07900	Other electric and electromechanical components
E10	**Electrolytes**
E10100	Electrolytes
E15	**Emulsion-inhibiting agents**
E15100	Emulsion-inhibiting agents
E20	**EP-additives**
E20100	EP-additives
F05	**Colouring agents**
F05100	Pigments to glazing materials, enamels and glass
F05110	Pigments to paint and printing inks
F05250	Pigment pastes
F05400	Regenerator to colours
F05990	Other colouring agents
F10	**Fixing agents**
F10100	Fixatives
F10300	Fixing agents for photocopies
F10400	Fixing agents for offset plates
F10700	Other fixing agents
F12	**Coating agents**
F12100	Coating agents
F15	**Flotation agents**
F15100	Flotation agents
F20	**Flux agents**
F20100	Flux agents (casting)
F32	**Chemicals for photographic use**
F32100	Bleachers for photographic film

Product code (UCN)	Product type
F32150	Toners to photographic paper
F32200	Fixatives for photographic film
F32300	Developers for photographic film
F32400	Film hardeners
F32600	Photographic emulsions
F32800	Stopping bath
F32900	Retouch chemicals
F32990	Other photographic chemicals
F35	**Developers**
F35200	Developers for photocopies
F35300	Offset developers
F35400	Other developers
F40	**Friction agents**
F40100	Friction agents
F45	**Fillers**
F45100	Reinforcing fillers
F45200	Extenders
F45300	Other fillers
F50	**Flocculating agents**
F50100	Flocculating chemicals
F50150	Slag initiators
F50200	Poly-electrolytes
F50300	Other flocculating agents
G05	**Galvano-technical agents**
G05100	Salts for galvanic baths
G05200	Glazing additives
G05300	Flux agents for hot electroplating
G05400	Other galvano-technical agents
G10	**Tanning agents**
G10100	Hair remover
G10200	Tannin
G10300	Pyring remedies
G10400	Thouging products
G10990	Other tanning agents
G12	**Glossing agents**
G12300	Calendring agents
G12900	Other glossing agents
G15	**Glazing materials, enamels, etc.**
G15100	Enamels
G15200	Glazing materials
G15300	Other related coatings
G30	**Flooring materials**
G30100	Joint-less floors
G30200	Other flooring materials
G35	**Rubberising materials**
G35100	Rubberising materials
G40	**Fertilizers**
G40100	Fertilizers
H10	**Hydraulic fluids**
H10100	Hydraulic oils
H10200	Brake Fluids
H10990	Hydraulic fluids, by general
H15	**Hardeners**
H15100	Concrete hardeners
H15400	Plastic hardeners
H15500	Other hardeners
I05	**Impregnation agents**
I05100	Leather impregnation agents
I05200	Paper impregnation agents
I05300	Textile impregnation agents
I05400	Wood impregnation agents , wood preserving agents
I05450	Closing net proofing
I05500	Other impregnation agents
I15	**Insulation materials**
I15100	Fire prevention materials
I15200	Other thermic insulating materials
I15300	Electric current insulation materials
I15400	Sound insulating materials
I15500	Light insulating materials
I15600	Other insulation materials
K15	**Coagulating agents**
K15100	Coagulating agents

Product code (UCN)	Product type
K20	**Sequestering agents**
K20100	Sequestering agents
K25	**Anti-condensation agents**
K25100	Anti-mist agents
K25200	Condensation removers
K25300	Other anti-condensation agents
K35	**Construction materials**
K35100	Cement/concrete/mortar
K35120	Fireproof cement
K35200	Plastic construction materials
K35300	Steel construction materials
K35500	Road construction materials
K35900	Other construction materials
K40	**Contractors**
K40100	Contactors (electrical)
K45	**Correction materials**
K45100	Correction lacquers (offices)
K45200	Correction lacquers (printing plates)
K45400	Erasing fluid
K45500	Eraser (rubber)
K45600	Other correction materials
K52	**Cosmetics**
K52110	Shaving foams
K52120	Shaving creams and lotions
K52190	Other shaving products
K52210	Body lotions
K52220	Face creams
K52230	Eye creams
K52240	Hands creams
K52250	Leg creams
K52260	Foot creams
K52270	Exfoliating crème
K52280	Depilatories
K52290	Sunbathing creams
K52300	After sun preparations
K52310	(toilet soaps, deodorant soaps, bath foams, shower gels)
K52320	Eye make-up removers
K52330	Make-up removers
K52350	Skin tonic
K52360	Bath salts and oils
K52370	Skin protection preparations
K52380	Face masks
K52390	Face steam bath
K52400	Anti-wrinkle products
K52410	Massage oils
K52420	Body powders
K52430	Products for external intimate hygiene
K52440	Skin-whitening products
K52450	Corn remedies
K52460	Deodorants
K52470	Antiperspirants
K52480	Skin care preparations for babies
K52490	Other skin care preparations
K52510	Hair bleaches
K52520	Hair dye permanent
K52530	Hair dye, semi-permanent
K52540	Hair dye, temporary
K52550	Hair cosmetics
K52560	Hair cleansing products (shampoos, powders etc)
K52570	Lotions for straighten out hair
K52580	Water undulation lotions
K52590	Permanent remedies
K52600	Hair balsam
K52610	Hair lotion
K52620	Hair mousse
K52630	Hair wax
K52640	Hair spray (hair lacquer)
K52650	Other hair setting products
K52660	Hair treatment
K52690	Other hair dressing products
K52710	Eye shadow
K52720	Mascara
K52730	Liner (kajal)
K52740	Other Eye make-up
K52750	Rouge
K52760	Powder (face)

Product code (UCN)	Product type
K52770	Lipstick and Lip salve
K52780	Lip liner
K52790	Other face make-up
K52800	Nail varnish
K52810	Nail varnish remover
K52820	Nail hardener
K52830	Cuticle remover
K52840	Other products for nail care and make-up
K52850	Face paints
K52860	Artist make-up and effects
K52870	Body paints
K52880	Products for tanning without sun
K52890	Perfumes, toilet waters and eau de Cologne
K52900	Other cosmetic products
K52910	Toothpaste for children
K52920	Toothpaste and other tooth-cleaning products
K52930	Tooth bleaching
K52940	Dental plate remedy
K52950	Tooth rinsing remedies
K52960	Chewing gum
K52980	Other tooth and mouth care products
K55	**Cooling agents**
K55100	Cooling agents
K60	**Cooling agents for metal processing**
K60100	Drilling oils
K60140	Threading oils
K60150	Honing oils
K60160	Lubricants for broaching
K60200	Cooling agents for grinding
K60250	Other fluids for removing metal
K60300	Milling oils
K60350	Other fluids for modelling metal
K60400	Punching oils
K60450	Other fluids for cutting metal
K60500	Other cutting fluids
L05	**Laboratory chemicals**
L05100	Reagents
L05200	Indicators (pH-Indicators)
L05250	Nutritive medium - Chemicals and products that for growing of micro-organisms
L05300	Other laboratory chemicals
L10	**Adhesives**
L1010	Adhesives, water based
L1020	Adhesives, based on organic thinners
L1030	Adhesives, no thinner
L1040	Adhesives, powder
L1050	Adhesives, cyanoacrylate
L1060	Hardener for adhesive
L15	**Soldering agents**
L15100	Flux agents for soldering
L15200	Soldering metals
L15990	Other soldering agents
L20	**Pharmaceuticals**
L20050	Veterinary pharmaceuticals
L20080	Anaesthesia
L20100	Pharmaceuticals for organs of digestion and metabolism
L20200	Pharmaceuticals for blood and blood-generating organs
L20250	Pharmaceuticals for heart- and circulation
L20300	Pharmaceuticals for skin treatment (dermatological agents)
L20400	Pharmaceuticals for the urinary system (not sexual hormones)
L20430	Sexual hormones (incl contraceptive (P-) pills)
L20450	Hormones for systemic use
L20500	Pharmaceuticals for infectious diseases, systemic preparations
L20600	Pharmaceuticals for muscles, joints and bones
L20700	Pharmaceuticals for the central nervous system
L20800	Pharmaceuticals for respiration organs
L20850	Pharmaceuticals for sense organs
L20910	AI preparations
L20920	Cytostatica and immune-suppressive preparations
L20930	Other therapeutic preparations
L20940	Diagnostic preparations
L20960	Diet preparations
L20990	Other pharmaceuticals

Product code (UCN)	Product type		
M05…	**Paint and varnish**		
…	1 Water based	1 Active biological/biocide function (not antifouling)	1 Interior
…	2 Volatile organic thinner	2 Fire prevention	2 Exterior
…	3 Non volatile organic thinner e.g. Linseed oil	3 Active corrosion inhibitor	3 Industrial use
…	4 No thinner	4 Decorative/protection	4 Base colour for boats and ships
…	5 Powder based	9 Other (including road-, art-, furniture-, auto paint)	5 Powder based
…	6 Hardeners to paint and varnish		
M08	**Paint and varnish, additives**		
M08100	Additives for paint and varnishes not mentioned elsewhere in the table. Pigments are not to be classified in this code		
M10	**Paint and varnish removers**		
M10100	Remover for printing ink		
M10200	Graffiti removers		
M10300	Paint and varnish removers		
M15	**Metal surface treatment**		
M15100	Metal staining agents		
M15200	Non-galvanic metal surface coatings (chromatisising agents)		
M15300	Hardening agents (metal, tarnishing agents)		
M15400	Rust removers		
M15500	Other surface treatment of metal		
O15	**Solvents**		
O15100	Solvents		
O25	**Surface active agents**		
O25100	Moisturizers		
O25200	Dispersion agents (carriers)		
O25300	Emulsifiers		
O25400	Anti foaming agents, foam reducing agents		
O25500	Other surface active agents		
O27	**Surface treatment of paper, cardboard and other non-metals**		
O27100	Surface treatment for paper and cardboard		
O27200	Corroding agent for electronics		
O27300	Corroding agent for glass		
O27900	Other surface treatment for other non-metals		
O30	**Stove black polish**		
O30100	Stove black polish		
O40	**Oxidation agents**		
O40100	Burnishing (bronzing) agents		
O40200	Other oxidation agents		
P01	**Washers and gaskets**		
P01200	Bearing linings		
P01300	Gaskets, unspecified		
P01400	Gaskets for fuel engines		
P01600	Gaskets for pumps, machines, boilers etc		
P01900	Other gaskets		
P05	**PH-regulating agents**		
P05100	PH-regulating agents		
P10	**Polishing agents**		
P10050	Polishing agents for rubber materials		
P10100	Polishing agents for lacquers (car wax)		
P10150	Polishing agents for leather (incl shoe polish)		
P10200	Polishing agents for metal		
P10400	Polishing agents for furniture		
P10450	Polishing agents for plastic materials		
P10500	Wax and other polishing preparations for floors		
P10990	Other polishing agents		
P15	**Process regulators**		
P15100	Accelerators		
P15200	Activators		
P15300	Retarders		
P15400	Other inhibitors		
P15500	Catalysts		
P15900	Process regulators		
R03	**Radioactive materials**		
R03100	Radioactive materials		
R05	**Reduction agents**		
R05100	Reduction agents		

Product code (UCN)	Product type
R10	**Cleaning products**
R10100	Degreasers (cold degreasing, de-waxing, de-polishing)
R10130	Drain Cleaners
R10150	General cleaning products (floor wash, basic cleaning)
R10160	Auto shampoo
R10250	Glass- and window cleaner (window polish)
R10330	High pressure cleaning products
R10340	Anti-incrustators
R10350	Lime deposit (calcium) remover
R10370	Cleaning/washing agents for washing machines
R10400	Cleaning/washing agents for dish washing (machines)
R10450	Stove- and grill cleaning agents
R10500	Spot (stain) removers
R10600	Foam cleaning/washing agents
R10700	Windscreen washing agents
R10800	Carpet detergents
R10970	Washing agents for textile (detergents)
R10980	Optical whiteners
R10990	Other cleaning/washing agents
R15	**Cracking indicators**
R15100	Cracking indicators
R20	**Anti-corrosion materials**
R20100	Underseal materials, incl cavity seals
R20200	Corrosion inhibitors
R20900	Other anti-corrosion materials
R30	**Raw materials**
R30100	Raw materials for synthesis and intermediate products
R30200	Raw materials for production of glass and ceramics
R30300	Raw materials for production of rubber products
R30400	Raw materials for production of semi-conductors
R30500	Raw materials for production of cosmetics etc
R30600	Raw materials for production of medicament/medicine
R30700	Raw materials for production of metals
R30800	Raw materials for production of plastics
R30900	Raw materials for production of paper
R30990	Other raw materials
S05	**Sanitation agents**
S05150	Oil sanitation agents
S05200	Other sanitation agents
S07	**Sensitisers**
S07100	Sensitisers for photocopies
S07200	Sensitisers for serigraphy
S07900	Other sensitisers
S10	**Writing agents**
S10100	Writing ink
S10200	Ribbons
S10300	Carbon paper
S10400	Self-copying paper
S10500	Spirit markers
S10600	Other writing materials
S15	**Foaming agents**
S15100	Foaming agents for solid materials, plastic, rubber etc
S15200	Foaming agents for liquids
S25	**Rinsing agents**
S25100	Rinsing agents (for dish washing machines)
S25500	Rinsing agents (textiles)
S25990	Other rinsing agents
S30	**Sludge treatment preparations**
S30100	Sludge treatment preparations
S35	**Abrasives**
S35100	Abrasives
S40	**Anti-setoff agents**
S40100	Oils and waxes for laths and shutters
S40200	Casting slips for plastic etc
S40300	Slip agents for modelling metal
S40400	Slip agents for sand moulding
S40500	Other anti-setoff agents
S42	**Food and fodder additives**
S42100	Aroma boosters
S42200	Ensilage means
S42300	Nutrient - (included vitamins)
S42500	Sweetening agents
S42600	Food colours

Product code (UCN)	Product type		
S42900	Other food and fodder additives		
S45	**Lubricants**		
S45110	Base Oils		
S45120	Brake grease		
S45150	Gear oils		
S45170	Stiff (cup) grease		
S45180	Motor oils		
S45200	Friction-reducing additives		
S45250	Additive to lubricating agents		
S45300	Other lubricants		
S50	**Explosives etc.**		
S50100	Gunpowder		
S50200	Pyrotechnical products		
S50900	Other explosives		
S60	**Stabilizers**		
S60100	Antioxidants (anti-ozonants)		
S60150	Anti-siccatives		
S60200	Other stabilizers		
S65	**Moulding compounds**		
S65100	Moulding compounds		
S70	**Dust laying agents**		
S70100	Dust laying agents		
S75	**Welding products**		
S75100	Flux agents for welding		
S75200	Electrodes (welding)		
S75400	Other welding auxiliaries		
S80	**Stimulating agents**		
S80100	Stimulating agents		
T10	**Toners**		
T10200	Toners for photocopies and laser printers		
T10900	Other toners		
T15…	**Printing ink**		
…	1 Water base	1 Letterpress printing	1 Paper/cardboard/ paperboard
…	2 Based on organic thinner	2 Rotogravure	2 Metal
…	3 No thinner	3 Flexocolour (aniline dye)	3 Plastic
…	4 Powder	4 Offset printing	4 Fabric
…	5 Hardener to printing inks	5 Serigraphic printing	5 Other
…	6 Additive to printing inks	6 Fabric printing	
		7 Other	
T20	**Drying agents**		
T20100	Drying agents		
U05	**Filling agents**		
U05100	Padding (filling) materials		
U05200	Stopping material		
U05300	Tightening materials (putty)		
U05340	Sealing agents for rock		
U05350	Curing agents for padding		
U05400	Other filling materials		
V05	**Water softeners**		
V05100	Water softeners		
V10	**Heat transmission agents**		
V10100	Heat transmission agents		
V15	**Viscosity changing agents**		
V15100	Thickening agents		
V15200	Gelatinising agents		
V15400	Thixotropic additives		
V15500	Other viscosity-changing agents		
V20	**Vulcanizers**		
V20100	Vulcanizers		

A5. Raw materials (Intermediates)

List of substances assumed to be raw material (intermediates) when associated with a product type code for raw material (R30). The selection is based on Fischer et al. (2005). The following substances has been added to the list compiled by Fischer et al. 2005: 1,2-dichloroethane (CAS 107-06-2), nickel (CAS 7440-02-0) and zinc (powder) (CAS 7440-66-6).

CAS	Substance name
50-00-0	formaldehyde
50-32-8	benzo(a)pyrene
75-01-4	vinyl chloride
75-07-0	acetaldehyde
75-21-8	ethylene oxide
77-73-6	4,7-methano-1H-indene, 3ª,4,7,7ª-tetrahydro-
80-05-7	4,4'-Isopropylidenediphen
85-44-9	phthalic anhydride
106-99-0	buta-1,3-diene
107-06-2	1,2-dichloroethane
107-13-1	acrylonitrile
108-95-2	phenol
110-01-0	tetrahydrothiophene
123-77-3	C,C'-azodi(formamide)
127-18-4	tetrachloroethene (PER)
584-84-9	4-methyl-m-phenylene diisocyanate
2425-79-8	1,4-bis(2,3-epoxypropoxy)butane
6864-37-5	2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)
7440-02-0	nickel carbonate
7440-66-6	zinc
8002-05-9	petroleum
64741-53-3	distillates (petroleum), heavy naphthenic
65996-93-2	pitch, coal tar, high-temp.

A6. Emission factors

List of emission factors, given for combinations of specific substances (CAS), groups of substances, product types, industrial sectors and whether the substances are considered to be used as raw materials or not.

CAS	Group	Raw material	Product code			NACE			Emission factor
Specified	Non-VOC	No	A01000	-	V20100	27	-	27	0.0001
Specified	Non-VOC	No	A01000	-	V20100	26	-	27	0.001
Specified	Non-VOC	No	B15720	-	B15720	Private, 01	-	35	0.9
Specified	Non-VOC	No	B15720	-	B15720	35.12	-	99	0.9
Specified	Non-VOC	No	B15720	-	B15720	35.11	-	35.11	0
Specified	Non-VOC	No	B25300	-	B25300	24	-	24	0.0001
Specified	Non-VOC	No	B25300	-	B25300	21	-	23	0.06
Specified	Non-VOC	No	B60100	-	B60299	Private, 01	-	22	1
Specified	Non-VOC	No	B60100	-	B60299	24	-	99	1
Specified	Non-VOC	No	M05000	-	M05999	35.11	-	35.11	0
Specified	Non-VOC	No	R30100	-	R30100	21	-	21	0.06
Specified	Non-VOC	No	R30700	-	R30700	27	-	27	0.00005
Specified	Non-VOC	No	R30700	-	R30700	15	-	37	0.0001
Not specified	Non-VOC	No	A00000	-	V20100	Private, 01	-	99	1
Not specified	Non-VOC	No	A05100	-	A05400	Private, 01	-	99	0.1
Not specified	Non-VOC	No	A20100	-	A20100	Private, 01	-	99	1
Not specified	Non-VOC	No	A40100	-	A40300	Private, 01	-	99	1
Not specified	Non-VOC	No	A45100	-	A55100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	A60100	-	A60100	Private, 01	-	99	1
Not specified	Non-VOC	No	B15110	-	B15120	Private, 01	-	99	1
Not specified	Non-VOC	No	B15130	-	B15130	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15140	-	B15150	Private, 01	-	99	1
Not specified	Non-VOC	No	B15310	-	B15310	Private, 01	-	23	1
Not specified	Non-VOC	No	B15310	-	B15310	25	-	99	1
Not specified	Non-VOC	No	B15310	-	B15310	24	-	24	0.0001
Not specified	Non-VOC	No	B15315	-	B15360	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15370	-	B15370	Private, 01	-	99	1
Not specified	Non-VOC	No	B15399	-	B15399	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15510	-	B15510	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15550	-	B15550	Private, 01	-	99	1
Not specified	Non-VOC	No	B15560	-	B15560	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15710	-	B15720	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B15730	-	B15730	Private, 01	-	99	0.1
Not specified	Non-VOC	No	B16110	-	B16190	Private, 01	-	99	1
Not specified	Non-VOC	No	B16120	-	B16120	Private, 01	-	23	1
Not specified	Non-VOC	No	B16120	-	B16120	25	-	99	1
Not specified	Non-VOC	No	B16120	-	B16120	24	-	24	0.0001
Not specified	Non-VOC	No	B18100	-	B18100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B20100	-	B20100	Private, 01	-	23	0.5
Not specified	Non-VOC	No	B20100	-	B20100	26	-	99	0.5
Not specified	Non-VOC	No	B20100	-	B20100	24	-	25	0.0001
Not specified	Non-VOC	No	B20200	-	B20200	Private, 01	-	99	0.1
Not specified	Non-VOC	No	B20300	-	B20300	Private, 01	-	23	0.5
Not specified	Non-VOC	No	B20300	-	B20300	26	-	99	0.5
Not specified	Non-VOC	No	B20300	-	B20300	24	-	25	0.0001
Not specified	Non-VOC	No	B25200	-	B25300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B30100	-	B30100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	B35100	-	B35200	Private, 01	-	23	0.5
Not specified	Non-VOC	No	B35100	-	B35200	26	-	99	0.5
Not specified	Non-VOC	No	B35100	-	B35200	24	-	25	0.0001
Not specified	Non-VOC	No	B45100	-	B45100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	B50100	-	B50100	Private, 01	-	99	1
Not specified	Non-VOC	No	B55100	-	B55100	Private, 01	-	22	0.0025
Not specified	Non-VOC	No	B55100	-	B55100	24	-	99	0.0025
Not specified	Non-VOC	No	B55100	-	B60299	23	-	23	0.00005
Not specified	Non-VOC	No	B55150	-	B55150	Private, 01	-	99	0.1
Not specified	Non-VOC	No	B55200	-	B55200	Private, 01	-	99	0.000005
Not specified	Non-VOC	No	B55300	-	B55300	Private, 01	-	99	0.00125
Not specified	Non-VOC	No	B60100	-	B60299	Private, 01	-	22	0.0025

CAS	Group	Raw material	Product code			NACE			Emission factor
Not specified	Non-VOC	No	B60100	-	B60299	24	-	99	0.0025
Not specified	Non-VOC	No	B65100	-	B65100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	D15100	-	D15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	D20100	-	D20300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	D25100	-	D25100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	E03100	-	E05100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	E07100	-	E07900	Private, 01	-	99	0.1
Not specified	Non-VOC	No	E10100	-	E10100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	E15100	-	E15100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	E20100	-	E20100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	F05100	-	F05990	Private, 01	-	23	0.5
Not specified	Non-VOC	No	F05100	-	F05990	26	-	99	0.5
Not specified	Non-VOC	No	F05100	-	F05990	24	-	25	0.0001
Not specified	Non-VOC	No	F10100	-	F10100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F10700	-	F10700	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F12100	-	F12100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F15100	-	F15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F20100	-	F20100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	F32100	-	F35400	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F40100	-	F40100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	F45100	-	F45300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F50100	-	F50150	Private, 01	-	99	0.5
Not specified	Non-VOC	No	F50200	-	F50200	Private, 01	-	99	0.1
Not specified	Non-VOC	No	F50300	-	F50300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G05100	-	G05400	Private, 01	-	99	0.1
Not specified	Non-VOC	No	G10100	-	G10990	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G12300	-	G12900	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G15100	-	G15300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G30100	-	G30100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	G30200	-	G30200	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G35100	-	G35100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	G40100	-	G40100	Private, 01	-	23	1
Not specified	Non-VOC	No	G40100	-	G40100	25	-	99	1
Not specified	Non-VOC	No	G40100	-	G40100	24	-	24	0.0001
Not specified	Non-VOC	No	H10100	-	H10100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	H10200	-	H10200	Private, 01	-	99	1
Not specified	Non-VOC	No	H15100	-	H15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	H15400	-	H15500	Private, 01	-	99	0.1
Not specified	Non-VOC	No	I05100	-	I05400	Private, 01	-	99	0.5
Not specified	Non-VOC	No	I05450	-	I05500	Private, 01	-	99	1
Not specified	Non-VOC	No	I15100	-	I15600	Private, 01	-	99	0.1
Not specified	Non-VOC	No	K15100	-	K15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K20100	-	K20100	Private, 01	-	23	1
Not specified	Non-VOC	No	K20100	-	K20100	25	-	99	1
Not specified	Non-VOC	No	K20100	-	K20100	24	-	24	0.0001
Not specified	Non-VOC	No	K25100	-	K25300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K35100	-	K35120	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K35200	-	K35200	Private, 01	-	99	1
Not specified	Non-VOC	No	K35300	-	K35300	Private, 01	-	99	0.1
Not specified	Non-VOC	No	K35500	-	K35900	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K40100	-	K40100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K45100	-	K45600	Private, 01	-	99	0.1
Not specified	Non-VOC	No	K52120	-	K52300	Private, 01	-	99	0.1
Not specified	Non-VOC	No	K52310	-	K52350	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52370	-	K52370	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52490	-	K52490	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52560	-	K52560	Private, 01	-	99	1
Not specified	Non-VOC	No	K52620	-	K52620	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52640	-	K52640	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52890	-	K52900	Private, 01	-	99	0.5
Not specified	Non-VOC	No	K52910	-	K52980	Private, 01	-	99	1
Not specified	Non-VOC	No	K55100	-	K55100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	K60100	-	K60500	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L05100	-	L05300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L10101	-	L10102	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L10201	-	L10301	Private, 01	-	99	0.1
Not specified	Non-VOC	No	L10302	-	L10402	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L10501	-	L10602	Private, 01	-	99	0.1
Not specified	Non-VOC	No	L15100	-	L15990	Private, 01	-	99	0.1
Not specified	Non-VOC	No	L20050	-	L20050	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L20250	-	L20250	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L20600	-	L20600	Private, 01	-	99	0.5
Not specified	Non-VOC	No	L20990	-	L20990	Private, 01	-	99	0.5
Not specified	Non-VOC	No	M05111	-	M05112	Private, 01	-	99	1
Not specified	Non-VOC	No	M05113	-	M05114	Private, 01	-	99	0.5
Not specified	Non-VOC	No	M05121	-	M05121	Private, 01	-	99	1
Not specified	Non-VOC	No	M05123	-	M05124	Private, 01	-	99	0.5
Not specified	Non-VOC	No	M05131	-	M05131	Private, 01	-	99	1
Not specified	Non-VOC	No	M05133	-	M05134	Private, 01	-	99	0.5
Not specified	Non-VOC	No	M05139	-	M05139	Private, 01	-	99	0.5

CAS	Group	Raw material	Product code	NACE	Emission factor
Not specified	Non-VOC	No	M05141 - M05141	Private, 01 - 99	1
Not specified	Non-VOC	No	M05142 - M05144	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05149 - M05149	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05211 - M05214	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05219 - M05219	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05223 - M05224	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05231 - M05232	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05233 - M05234	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05239 - M05239	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05241 - M05242	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05243 - M05244	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05249 - M05249	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05314 - M05314	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05323 - M05323	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05333 - M05334	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05341 - M05344	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05349 - M05349	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05413 - M05413	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05422 - M05422	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05423 - M05423	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05432 - M05432	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05433 - M05434	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05439 - M05442	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05443 - M05444	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05449 - M05449	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05531 - M05531	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05533 - M05533	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05541 - M05544	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05549 - M05549	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05613 - M05614	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05632 - M05632	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05633 - M05634	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05639 - M05639	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05641 - M05642	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M05643 - M05644	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M05649 - M05649	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M08100 - M08100	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M10100 - M10300	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M10990 - M10990	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M15100 - M15200	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M15300 - M15300	Private, 01 - 99	0.1
Not specified	Non-VOC	No	M15400 - M15400	Private, 01 - 99	0.5
Not specified	Non-VOC	No	M15500 - M15500	Private, 01 - 99	0.1
Not specified	Non-VOC	No	O05010 - O05990	Private, 01 - 99	0
Not specified	Non-VOC	No	O15100 - O15100	Private, 01 - 99	0.5
Not specified	Non-VOC	No	O25100 - O25400	Private, 01 - 23	0.5
Not specified	Non-VOC	No	O25100 - O25400	26 - 99	0.5
Not specified	Non-VOC	No	O25100 - O25400	24 - 25	0.0001
Not specified	Non-VOC	No	O25500 - O25500	Private, 01 - 99	1
Not specified	Non-VOC	No	O27100 - O27100	Private, 01 - 23	0.5
Not specified	Non-VOC	No	O27100 - O27100	25 - 99	0.5
Not specified	Non-VOC	No	O27100 - O27100	24 - 24	0.0001
Not specified	Non-VOC	No	O27200 - O27200	Private, 01 - 99	0.1
Not specified	Non-VOC	No	O27300 - O27300	Private, 01 - 99	0.1
Not specified	Non-VOC	No	O27900 - O27900	Private, 01 - 99	0.5
Not specified	Non-VOC	No	O30100 - O30100	Private, 01 - 99	0.1
Not specified	Non-VOC	No	O40100 - O40200	Private, 01 - 99	0.1
Not specified	Non-VOC	No	P01400 - P01400	Private, 01 - 99	0.5
Not specified	Non-VOC	No	P01900 - P01900	Private, 01 - 99	0.5
Not specified	Non-VOC	No	P05100 - P05100	Private, 01 - 99	0.5
Not specified	Non-VOC	No	P10050 - P10050	Private, 01 - 99	0.1
Not specified	Non-VOC	No	P10100 - P10100	Private, 01 - 99	0.5
Not specified	Non-VOC	No	P10150 - P10990	Private, 01 - 99	0.1
Not specified	Non-VOC	No	P15100 - P15200	Private, 01 - 23	0.1
Not specified	Non-VOC	No	P15100 - P15200	26 - 99	0.1
Not specified	Non-VOC	No	P15100 - P15900	24 - 25	0.0001
Not specified	Non-VOC	No	P15300 - P15300	Private, 01 - 23	0.5
Not specified	Non-VOC	No	P15300 - P15300	26 - 99	0.5
Not specified	Non-VOC	No	P15400 - P15900	Private, 01 - 23	0.1
Not specified	Non-VOC	No	P15400 - P15900	26 - 99	0.1
Not specified	Non-VOC	No	R05100 - R05100	Private, 01 - 99	0.5
Not specified	Non-VOC	No	R10100 - R10160	Private, 01 - 99	1
Not specified	Non-VOC	No	R10250 - R10250	Private, 01 - 99	0.1
Not specified	Non-VOC	No	R10330 - R10330	Private, 01 - 99	0.5
Not specified	Non-VOC	No	R10340 - R10340	Private, 01 - 99	0.1
Not specified	Non-VOC	No	R10350 - R10600	Private, 01 - 99	1
Not specified	Non-VOC	No	R10700 - R10800	Private, 01 - 99	0.5
Not specified	Non-VOC	No	R10970 - R10990	Private, 01 - 23	1
Not specified	Non-VOC	No	R10970 - R10990	25 - 99	1
Not specified	Non-VOC	No	R10970 - R10990	24 - 24	0.0001

CAS	Group	Raw material	Product code			NACE			Emission factor
Not specified	Non-VOC	No	R15100	-	R15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	R20100	-	R20900	Private, 01	-	99	0.5
Not specified	Non-VOC	No	R30100	-	R30100	Private, 01	-	23	0.1
Not specified	Non-VOC	No	R30100	-	R30100	26	-	99	0.1
Not specified	Non-VOC	Yes	R30100	-	R30999	Private, 01	-	99	0.0001
Not specified	Non-VOC	No	R30100	-	R30999	24	-	25	0.0001
Not specified	Non-VOC	No	R30200	-	R30200	Private, 01	-	99	0.00001
Not specified	Non-VOC	No	R30300	-	R30300	Private, 01	-	99	0.00005
Not specified	Non-VOC	No	R30500	-	R30600	Private, 01	-	99	0.00005
Not specified	Non-VOC	No	R30700	-	R30800	Private, 01	-	99	0.0001
Not specified	Non-VOC	No	R30900	-	R30900	Private, 01	-	99	0.00005
Not specified	Non-VOC	No	R30990	-	R30990	Private, 01	-	99	0.00001
Not specified	Non-VOC	No	S05150	-	S05150	Private, 01	-	99	1
Not specified	Non-VOC	No	S05200	-	S05200	Private, 01	-	99	0.5
Not specified	Non-VOC	No	S10100	-	S10600	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S15100	-	S15200	Private, 01	-	99	1
Not specified	Non-VOC	No	S25100	-	S25990	Private, 01	-	99	1
Not specified	Non-VOC	No	S30100	-	S30100	Private, 01	-	99	1
Not specified	Non-VOC	No	S35100	-	S35100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S40100	-	S40500	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S42200	-	S42200	Private, 01	-	99	0.5
Not specified	Non-VOC	No	S42900	-	S42900	Private, 01	-	99	0.5
Not specified	Non-VOC	No	S45110	-	S45300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	S50200	-	S50200	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S50900	-	S50900	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S60100	-	S60100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	S60200	-	S60200	Private, 01	-	23	0.5
Not specified	Non-VOC	No	S60200	-	S60200	26	-	99	0.5
Not specified	Non-VOC	No	S60200	-	S60200	24	-	25	0.0001
Not specified	Non-VOC	No	S65100	-	S65100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S70100	-	S70100	Private, 01	-	99	1
Not specified	Non-VOC	No	S75400	-	S75400	Private, 01	-	99	0.1
Not specified	Non-VOC	No	S90100	-	S90100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15121	-	T15121	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15131	-	T15131	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15153	-	T15153	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15221	-	T15221	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15225	-	T15225	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15231	-	T15231	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15233	-	T15233	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15235	-	T15235	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15241	-	T15241	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15251	-	T15253	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15255	-	T15255	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15271	-	T15271	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15275	-	T15275	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15311	-	T15311	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15313	-	T15313	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15323	-	T15323	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15331	-	T15331	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15333	-	T15333	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15341	-	T15341	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15343	-	T15343	Private, 01	-	99	0.1
Not specified	Non-VOC	No	T15351	-	T15351	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15353	-	T15353	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15355	-	T15355	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15551	-	T15551	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15553	-	T15553	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15555	-	T15555	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15575	-	T15575	Private, 01	-	99	0.5
Not specified	Non-VOC	No	T15641	-	T15641	Private, 01	-	99	1
Not specified	Non-VOC	No	T15675	-	T15675	Private, 01	-	23	0.5
Not specified	Non-VOC	No	T15675	-	T15675	25	-	99	0.5
Not specified	Non-VOC	No	T15675	-	T15675	24	-	24	0.0001
Not specified	Non-VOC	No	T20100	-	T20100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	U05100	-	U05300	Private, 01	-	99	0.5
Not specified	Non-VOC	No	U05340	-	U05340	Private, 01	-	99	1
Not specified	Non-VOC	No	U05350	-	U05350	Private, 01	-	99	0.1
Not specified	Non-VOC	No	U05400	-	U05400	Private, 01	-	99	1
Not specified	Non-VOC	No	V10100	-	V10100	Private, 01	-	99	0.1
Not specified	Non-VOC	No	V15100	-	V15100	Private, 01	-	99	0.5
Not specified	Non-VOC	No	V15400	-	V15400	Private, 01	-	99	0.1
Not specified	Non-VOC	No	V15500	-	V15500	Private, 01	-	99	0.5
Not specified	Non-VOC	No	V20100	-	V20100	Private, 01	-	99	0.1
Not specified	VOC	No	A00000	-	V20100	Private, 01	-	99	1
Not specified	VOC	No	A05000	-	A40199	24	-	24	0.0025
Not specified	VOC	No	A05000	-	B14999	20	-	20	0.25
Not specified	VOC	No	A05000	-	B15700	15	-	16	0.25
Not specified	VOC	No	A05000	-	B15700	11	-	11	0.0025
Not specified	VOC	No	A05000	-	B15710	35	-	36	0.25

CAS	Group	Raw material	Product code			NACE			Emission factor	
Not specified	VOC	No	A05000	-	B15710	34	-	34	0.2	
Not specified	VOC	No	A05000	-	B15710	26	-	33	0.25	
Not specified	VOC	No	A05000	-	B15710	25	-	25	0.25	
Not specified	VOC	No	A05000	-	B15710	23	-	23	0.0025	
Not specified	VOC	No	A05000	-	B15710	22	-	22	0.55	*
Not specified	VOC	No	A05000	-	B15710	21	-	21	0.25	*
Not specified	VOC	No	A05000	-	B15710	18	-	19	0.1	
Not specified	VOC	No	A05000	-	B15710	17	-	17	0.1	
Not specified	VOC	No	A40000	-	A40999	60	-	62	0.1	
Not specified	VOC	No	A40200	-	A40300	24	-	24	0.001	
Not specified	VOC	No	A40400	-	B15710	24	-	24	0.0025	*
Not specified	VOC	No	A55100	-	A60100	93	-	93	0.57	
Not specified	VOC	No	B15000	-	B15999	20	-	20	0.15	
Not specified	VOC	No	B15120	-	B15120	93	-	93	0.57	
Not specified	VOC	No	B15140	-	B15140	93	-	93	0.57	
Not specified	VOC	No	B15330	-	B15330	93	-	93	0.57	
Not specified	VOC	No	B15710	-	B15710	Private, 01	-	16	0.1	
Not specified	VOC	No	B15720	-	B15720	21	-	37	0.3	*
Not specified	VOC	No	B15720	-	B15720	15	-	19	0.3	*
Not specified	VOC	No	B15720	-	B15720	11	-	11	0.3	*
Not specified	VOC	No	B15730	-	B20299	25	-	25	0.25	*
Not specified	VOC	No	B15730	-	B20299	24	-	24	0.0025	*
Not specified	VOC	No	B15730	-	B54999	35	-	36	0.25	*
Not specified	VOC	No	B15730	-	B54999	34	-	34	0.2	
Not specified	VOC	No	B15730	-	B54999	26	-	33	0.25	*
Not specified	VOC	No	B15730	-	B54999	23	-	23	0.0025	*
Not specified	VOC	No	B15730	-	B54999	22	-	22	0.55	*
Not specified	VOC	No	B15730	-	B54999	21	-	21	0.25	*
Not specified	VOC	No	B15730	-	B54999	18	-	19	0.1	
Not specified	VOC	No	B15730	-	B54999	17	-	17	0.1	
Not specified	VOC	No	B15730	-	B54999	15	-	16	0.25	*
Not specified	VOC	No	B15730	-	B54999	11	-	11	0.0025	
Not specified	VOC	No	B16000	-	B16999	20	-	20	0.15	
Not specified	VOC	No	B17000	-	B54999	20	-	20	0.25	*
Not specified	VOC	No	B20300	-	B20300	24	-	25	0.001	
Not specified	VOC	No	B20400	-	B25299	25	-	25	0.25	*
Not specified	VOC	No	B20400	-	B25299	24	-	24	0.0025	*
Not specified	VOC	No	B25200	-	B25200	93	-	93	0.57	
Not specified	VOC	No	B25300	-	B25300	24	-	25	0.001	
Not specified	VOC	No	B25400	-	B54999	25	-	25	0.25	*
Not specified	VOC	No	B25400	-	B54999	24	-	24	0.0025	*
Not specified	VOC	No	B35200	-	B35200	93	-	93	0.57	
Not specified	VOC	No	B55100	-	B55100	Private, 01	-	99	0.0025	
Not specified	VOC	No	B55200	-	B55200	Private, 01	-	99	0.000005	
Not specified	VOC	No	B55300	-	B55300	Private, 01	-	99	0.00125	
Not specified	VOC	No	B60100	-	B60299	Private, 01	-	22	0.0025	
Not specified	VOC	No	B60100	-	B60299	24	-	99	0.0025	
Not specified	VOC	No	B60100	-	B60299	23	-	23	0.00005	
Not specified	VOC	No	B61000	-	E03099	25	-	25	0.25	*
Not specified	VOC	No	B61000	-	E03099	24	-	24	0.0025	*
Not specified	VOC	No	B61000	-	H19999	20	-	20	0.25	*
Not specified	VOC	No	B61000	-	L20999	35	-	36	0.25	*
Not specified	VOC	No	B61000	-	L20999	34	-	34	0.2	
Not specified	VOC	No	B61000	-	L20999	26	-	33	0.25	*
Not specified	VOC	No	B61000	-	L20999	23	-	23	0.0025	*
Not specified	VOC	No	B61000	-	L20999	22	-	22	0.55	*
Not specified	VOC	No	B61000	-	L20999	21	-	21	0.25	*
Not specified	VOC	No	B61000	-	L20999	18	-	19	0.1	
Not specified	VOC	No	B61000	-	L20999	17	-	17	0.1	
Not specified	VOC	No	B61000	-	L20999	15	-	16	0.25	*
Not specified	VOC	No	B61000	-	L20999	11	-	11	0.0025	
Not specified	VOC	No	D20300	-	D20300	93	-	93	0.57	
Not specified	VOC	No	E03100	-	E03100	24	-	25	0.001	
Not specified	VOC	No	E03200	-	H15399	25	-	25	0.25	*
Not specified	VOC	No	E03200	-	H15399	24	-	24	0.0025	*
Not specified	VOC	No	E20000	-	E20999	Private, 01	-	99	0	
Not specified	VOC	No	F05990	-	F05990	93	-	93	0.57	
Not specified	VOC	No	G10400	-	G10400	93	-	93	0.57	
Not specified	VOC	No	H15400	-	H15400	24	-	25	0.001	
Not specified	VOC	No	H15500	-	K35199	25	-	25	0.25	*
Not specified	VOC	No	H15500	-	K35199	24	-	24	0.0025	*
Not specified	VOC	No	I05000	-	I05999	20	-	20	0.15	
Not specified	VOC	No	I05100	-	I05100	93	-	93	0.57	
Not specified	VOC	No	I05300	-	I05300	93	-	93	0.57	
Not specified	VOC	No	I05500	-	I05500	93	-	93	0.57	
Not specified	VOC	No	I06000	-	L20999	20	-	20	0.25	*
Not specified	VOC	No	K20100	-	K20100	93	-	93	0.57	
Not specified	VOC	No	K35200	-	K35200	24	-	25	0.001	
Not specified	VOC	No	K35300	-	L20999	25	-	25	0.25	*
Not specified	VOC	No	K35300	-	L20999	24	-	24	0.0025	*

CAS	Group	Raw material	Product code			NACE			Emission factor	
Not specified	VOC	No	L15000	-	L15999	Private, 01	-	99	0	
Not specified	VOC	No	M05000	-	M05999	25	-	37	0.3	*
Not specified	VOC	No	M05000	-	M05999	24.4	-	24.7	0.3	*
Not specified	VOC	No	M05000	-	M05999	24.3	-	24.3	0.001	
Not specified	VOC	No	M05000	-	M05999	24	-	24.2	0.3	*
Not specified	VOC	No	M05000	-	M05999	15	-	23	0.3	*
Not specified	VOC	No	M05000	-	M05999	11	-	11	0.3	*
Not specified	VOC	No	M08000	-	O04999	35	-	36	0.25	*
Not specified	VOC	No	M08000	-	O04999	34	-	34	0.2	
Not specified	VOC	No	M08000	-	O04999	26	-	33	0.25	*
Not specified	VOC	No	M08000	-	O04999	25	-	25	0.25	*
Not specified	VOC	No	M08000	-	O04999	24	-	24	0.0025	*
Not specified	VOC	No	M08000	-	O04999	23	-	23	0.0025	*
Not specified	VOC	No	M08000	-	O04999	22	-	22	0.55	*
Not specified	VOC	No	M08000	-	O04999	21	-	21	0.25	*
Not specified	VOC	No	M08000	-	O04999	20	-	20	0.25	*
Not specified	VOC	No	M08000	-	O04999	18	-	19	0.1	
Not specified	VOC	No	M08000	-	O04999	17	-	17	0.1	
Not specified	VOC	No	M08000	-	O04999	15	-	16	0.25	*
Not specified	VOC	No	M08000	-	O04999	11	-	11	0.0025	
Not specified	VOC	No	M10300	-	M10300	93	-	93	0.57	
Not specified	VOC	No	O05010	-	O05010	Private, 01	-	10	1	
Not specified	VOC	No	O05010	-	O05010	24	-	99	1	
Not specified	VOC	No	O05010	-	O05010	23	-	23	0.001	
Not specified	VOC	No	O05010	-	O05010	12	-	22	1	
Not specified	VOC	No	O05010	-	O05010	11	-	11	0.001	
Not specified	VOC	No	O05020	-	O15099	25	-	25	0.25	*
Not specified	VOC	No	O05020	-	O15099	24	-	24	0.0025	*
Not specified	VOC	No	O05020	-	R29999	20	-	20	0.25	*
Not specified	VOC	No	O05020	-	S42100	15	-	16	0.25	*
Not specified	VOC	No	O05020	-	S42100	11	-	11	0.0025	
Not specified	VOC	No	O05020	-	V20100	35	-	36	0.25	*
Not specified	VOC	No	O05020	-	V20100	34	-	34	0.2	
Not specified	VOC	No	O05020	-	V20100	26	-	33	0.25	*
Not specified	VOC	No	O05020	-	V20100	23	-	23	0.0025	*
Not specified	VOC	No	O05020	-	V20100	22	-	22	0.55	*
Not specified	VOC	No	O05020	-	V20100	21	-	21	0.25	*
Not specified	VOC	No	O05020	-	V20100	18	-	19	0.1	
Not specified	VOC	No	O05020	-	V20100	17	-	17	0.1	
Not specified	VOC	No	O15100	-	O15100	93	-	93	0.57	
Not specified	VOC	No	O15100	-	O15100	24	-	25	0.001	
Not specified	VOC	No	O15200	-	P15899	25	-	25	0.25	*
Not specified	VOC	No	O15200	-	P15899	24	-	24	0.0025	*
Not specified	VOC	No	O25100	-	O25500	93	-	93	0.57	
Not specified	VOC	No	P05100	-	P05100	93	-	93	0.57	
Not specified	VOC	No	P15900	-	P15900	24	-	25	0.001	
Not specified	VOC	No	P16000	-	R29999	25	-	25	0.25	*
Not specified	VOC	No	P16000	-	R29999	24	-	24	0.0025	*
Not specified	VOC	No	R10100	-	R10100	93	-	93	0.57	
Not specified	VOC	No	R10150	-	R10150	93	-	93	0.57	
Not specified	VOC	No	R10350	-	R10350	93	-	93	0.57	
Not specified	VOC	No	R10400	-	R10400	93	-	93	0.57	
Not specified	VOC	No	R10500	-	R10600	93	-	93	0.57	
Not specified	VOC	No	R10800	-	R10990	93	-	93	0.57	
Not specified	VOC	No	R20200	-	R20200	93	-	93	0.57	
Not specified	VOC	No	R30000	-	R30999	93	-	93	0.57	
Not specified	VOC	Yes	R30000	-	R30999	26	-	28	0.001	
Not specified	VOC	No	R30000	-	R30999	24	-	25	0.001	
Not specified	VOC	Yes	R30000	-	R30999	21	-	23	0.001	
Not specified	VOC	No	R30000	-	R30999	20	-	20	0.15	
Not specified	VOC	Yes	R30000	-	R30999	15	-	19	0.1	
Not specified	VOC	Yes	R30000	-	R30999	11	-	11	0.001	
Not specified	VOC	No	R31000	-	S42199	25	-	25	0.25	*
Not specified	VOC	No	R31000	-	S42199	24	-	24	0.0025	*
Not specified	VOC	No	R31000	-	V14999	20	-	20	0.25	*
Not specified	VOC	No	S25100	-	S25500	93	-	93	0.57	
Not specified	VOC	No	S42200	-	S42200	Private, 01	-	16	0.1	
Not specified	VOC	No	S42200	-	S42200	24	-	25	0.001	
Not specified	VOC	No	S42300	-	V20100	25	-	25	0.25	*
Not specified	VOC	No	S42300	-	V20100	24	-	24	0.0025	*
Not specified	VOC	No	S42300	-	V20100	15	-	16	0.25	*
Not specified	VOC	No	S42300	-	V20100	11	-	11	0.0025	
Not specified	VOC	No	S50000	-	S50999	Private, 01	-	99	0	
Not specified	VOC	No	S75000	-	S75999	Private, 01	-	99	0	
Not specified	VOC	No	V15400	-	V15400	20	-	20	0.15	
Not specified	VOC	No	V16000	-	V20100	20	-	20	0.25	*

*Emission factor for 2002 somewhat higher

Appendix B

Result tables

B1. Products contributing most to emissions, by hazard category, 2002-2007. Tonnes emitted

The products are sorted based on their cumulative emissions from 2002-2007. A complete list of the product type codes are given in Appendix A4.

Product type	2002	2003	2004	2005	2006	2007
CMR						
Energy goods (motor and heating fuels) (B55)	11533	10299	8639	10288	9429	11840
Raw materials (R30)	743	776	593	831	865	885
Biocides (B15)	251	166	637	944	1085	1116
Binding agents (B20)	594	820	426	464	212	197
Paint and varnish (M05)	255	321	214	186	188	175
Impregnation (I05)	738	451	49	43	27	16
Solvents (O15)	171	184	257	231	241	177
Electrolytes (E10)	28	20	131	201	246	267
Foaming agents (S15)	136	126	134	112	75	96
Insulation materials (I15)	75	81	90	72	91	84
Adhesives (L10)	87	65	83	77	82	74
Curing agents (H15)	71	71	86	81	78	45
Moulding compounds (S65)	81	78	69	42	42	52
Paint and varnish removers (M10)	55	52	49	44	42	56
Cleaning products (R10)	77	68	42	36	39	30
Fillers (F45)	55	30	42	42	59	62
Construction materials (K35)	130	50	36	34	14	22
Anti-freezing agents (A40)	49	66	4	8	16	9
Flame retardants (B45)	17	24	30	20	32	11
Filling materials (U05)	19	17	21	26	17	12
Galvano-technical agents (G05)	1	1	1	1	38	34
Hydraulic fluids (H10)	12	11	13	13	12	12
Laboratory chemicals (L10)	8	12	10	12	13	14
Other	114	92	65	56	135	94
Chronically toxic						
Energy goods (motor and heating fuels) (B55)	443	330	271	226	254	262
Solvents (O15)	157	164	239	222	232	170
Paint and varnish (M05)	123	102	83	89	94	99
Adhesives (L10)	68	45	61	58	68	54
Process regulators (P15)	12	2	3	16	18	247
Binding agents (B20)	55	45	41	46	45	41
Raw materials (R30)	50	37	33	40	34	31
Reduction agents (R05)	2	2	45	44	47	47
Paint and varnish removers (M10)	9	12	10	9	11	21
Impregnation (I05)	34	11	11	5	4	0
Cleaning products (R10)	28	9	6	7	6	4
Galvano-technical agents (G05)	24	5	4	13	4	4
Other	70	64	41	34	40	42
Sensitising						
Paint and varnish (M05)	934	1097	1021	825	683	478
Biocides (B15)	350	203	303	580	837	699
Binding agents (B20)	201	203	329	153	277	249
Construction materials (K35)	236	228	214	269	246	190
Raw materials (R30)	184	208	179	219	220	306
Insulation materials (I15)	184	176	184	150	191	186
Curing agents (H15)	151	135	200	181	174	133
Flooring materials (G30)	130	107	105	118	152	171
Foaming agents (S15)	144	153	141	123	84	103
Filling agents (U05)	95	102	107	122	126	155
Adhesives (L10)	82	72	71	74	68	54
Moulding compounds (S65)	83	80	71	44	44	54
Cleaning products (R10)	59	44	62	57	77	71
Impregnation (I05)	68	34	143	62	41	15
Glazing materials, enamels etc. (G15)	68	64	36	34	42	42
Process regulators (P15)	27	31	28	43	11	6
Colouring agents (F05)	5	6	6	6	2	57
Plant protection products (B16)	0	0	0	25	25	25
Other	133	83	82	65	77	69

Product type	2002	2003	2004	2005	2006	2007
Dangerous for the environment						
Biocides (B15)	498	809	1326	2030	2116	2092
Raw materials (R30)	751	607	401	915	532	688
Bleaching agents (B25)	542	612	860	583	585	297
Insulation materials (I15)	388	623	482	622	736	396
Paint and varnish (M05)	472	539	432	366	408	371
Cleaning products (R10)	360	266	670	614	263	192
Binding agents (B20)	455	492	504	341	111	239
Impregnation (I05)	189	287	359	81	47	15
Electrolytes (E10)	45	36	131	201	246	268
Construction materials (K35)	192	129	131	142	120	113
Foaming agents (S15)	137	127	145	122	85	100
Colouring agents (F05)	79	92	56	58	80	130
Flooring materials (G30)	59	63	62	75	80	82
Moulding compounds (S65)	82	79	70	43	43	53
Adhesives (L10)	55	40	56	70	57	64
Glazing materials, enamels etc. (G15)	96	70	38	39	46	41
Curing agents (H15)	40	57	59	37	44	29
Process regulators (P15)	30	34	32	45	29	52
Anti-corrosion materials (R20)	26	83	63	8	33	7
Filling materials (U05)	19	29	24	33	43	43
Galvano-technical agents (G05)	49	22	9	17	47	45
Other	229	241	264	245	283	280

B2. Substances contributing most to emissions, by hazard category, 2002-2007. Tonnes emitted

The substances are sorted based on their cumulative emissions from 2002-2007. For confidentiality reasons, some high-volume substances had to be included in "Other" within each hazard category.

CAS	Substance name	2002	2003	2004	2005	2006	2007
CMR							
68334-30-5	fuels, diesel	5538	4370	3336	5883	6355	6215
68476-30-2	fuel oil, no. -2	3434	3458	2698	3657	2574	5139
68476-33-5	fuel oil, residual	612	657	307	517	247	225
50-00-0	formaldehyde	381	306	300	260	557	546
108-88-3	toluene	465	327	399	379	398	345
630-08-0	carbon monoxide	211	272	282	249	279	280
584-84-9	4-methyl-m-phenylene diisocyanate	246	264	228	207	138	259
115-96-8	tris(2-chloroethyl) phosphate	336	364	234	251	56	79
65996-93-2	pitch, coal tar, high-temp.	165	136	162	160	171	123
1309-64-4	diantimony trioxide	155	371	109	111	48	32
107-22-2	glyoxal	64	65	79	121	177	102
26471-62-5	M-tolylidene diisocyanate	79	103	121	99	101	89
91-08-7	2-methyl-m-phenylene diisocyanate	80	69	66	56	40	66
96-29-7	2-butanone oxime	66	75	77	55	47	34
Other		3471	3044	3325	1860	1889	1846
Chronically toxic							
108-88-3	toluene	465	327	399	379	398	345
630-08-0	carbon monoxide	211	272	282	249	279	280
71-43-2	benzene	158	95	21	13	11	19
108-95-2	phenol	67	41	44	48	59	47
111-42-2	ethanol, 2,2'-iminobis-	13	12	7	8	10	222
1333-82-0	chromium trioxide	40	16	14	9	9	5
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	18	10	7	13	12	13
15096-52-3	trisodium hexafluoroaluminate (cryolite)	24	22	4	3	5	4
25321-14-6	dinitrotoluene	10	8	5	4	2	3
101-77-9	4,4'-methylenedianiline	8	7	6	6	2	1
68479-98-1	diethylmethylbenzenediamine	1	0	1	3	7	1
Other		60	18	58	72	64	82
Sensitising							
50-00-0	formaldehyde	381	306	300	260	557	546
101-68-8	4,4'-methylenediphenyl diisocyanate	223	180	215	251	371	390
25068-38-6	4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane (Bisphenol-A and epoxy resin)	271	197	206	231	234	243
584-84-9	4-methyl-m-phenylene diisocyanate	246	264	228	207	138	259
108-31-6	maleic anhydride	122	170	161	161	154	133
111-30-8	glutaral	106	29	27	244	240	100
2855-13-2	3-aminomethyl-3,5,5-trimethylcyclohexylamine	87	137	100	135	106	124
80-62-6	methyl methacrylate	114	95	80	112	104	112
107-22-2	glyoxal	64	65	79	121	177	102
8050-09-7	rosin	86	81	182	99	81	69
26471-62-5	M-tolylidene diisocyanate	79	103	121	99	101	89
1085-98-9	dichlofluanid	120	135	127	91	102	11
91-08-7	2-methyl-m-phenylene diisocyanate	80	69	66	56	40	66
96-29-7	2-butanone oxime	66	75	77	55	47	34
112-24-3	trientine	25	55	208	39	8	9
8006-64-2	turpentine, oil	15	15	72	55	87	49
26447-40-5	methylenediphenyl diisocyanate	43	26	24	17	35	35
5989-27-5	(R)-p-mentha-1,8-diene	25	14	17	21	32	21
100-97-0	methenamine	38	18	21	13	32	6
9014-01-1	subtilisin	17	14	18	19	22	24
1333-82-0	chromium trioxide	40	16	14	9	9	5
60207-90-1	1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (propiconazol)	11	10	11	17	15	18
141-32-2	butyl acrylate	12	22	13	9	8	11
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	18	10	7	13	12	13
123-31-9	hydroquinone	21	16	13	7	6	12
9000-90-2	alpha-amylase	6	5	9	10	14	16
26530-20-1	2-octyl-2H-isothiazol-3-one	2	1	1	1	1	51
7440-02-0	nickel carbonate	8	8	8	9	9	10
Other		807	889	873	788	629	508

CAS	Substance name	2002	2003	2004	2005	2006	2007
Dangerous for the environment							
1317-39-1	dicopper oxide	506	427	926	876	1018	906
7775-09-9	sodium chlorate	750	616	867	910	592	398
109-66-0	pentane	272	467	296	480	499	270
5329-14-6	sulphamidic acid	197	153	589	525	195	138
25068-38-6	4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane (Bisphenol-A and epoxy resin)	271	197	206	231	234	243
584-84-9	4-methyl-m-phenylene diisocyanate	246	264	228	207	138	259
115-96-8	tris(2-chloroethyl) phosphate	336	364	234	251	56	79
12069-69-1	copper(II) carbonate--copper(II) hydroxide (1:1)	109	283	121	119	179	193
1308-38-9	chromium (III) oxide	174	155	151	150	161	178
65996-93-2	pitch, coal tar, high-temp.	165	136	162	160	171	123
2855-13-2	3-aminomethyl-3,5,5-trimethylcyclohexylamine	87	137	100	135	106	124
78-78-4	2-methylbutane	59	110	116	108	162	61
26471-62-5	M-tolylidene diisocyanate	79	103	121	99	101	89
1085-98-9	dichlofluanid	120	135	127	91	102	11
142-82-5	heptane	92	78	72	82	75	81
1314-13-2	zinc oxide	54	39	86	75	68	105
91-08-7	2-methyl-m-phenylene diisocyanate	80	69	66	56	40	66
112-24-3	trientine	25	55	208	39	8	9
85535-85-9	alkanes, C14-17, chloro	58	59	21	30	36	125
7779-90-0	trizinc bis(orthophosphate)	40	98	81	25	49	29
7440-66-6	zinc	39	58	65	40	52	57
8006-64-2	turpentine, oil	15	15	72	55	87	49
95-63-6	1,2,4-trimethylbenzene	37	30	38	25	27	28
2893-78-9	troclosene sodium	32	28	24	25	27	24
1317-38-0	copper oxide	11	4	5	24	22	83
5989-27-5	(R)-p-mentha-1,8-diene	25	14	17	21	32	21
127-18-4	tetrachloroethene (PER)	9	16	10	19	22	24
7722-64-7	potassium permanganate	34	25	27	1	7	5
287-92-3	cyclopentane	13	12	17	14	17	23
1333-82-0	chromium trioxide	40	16	14	9	9	5
60207-90-1	1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (propiconazol)	11	10	11	17	15	18
51580-86-0	troclosene sodium, dihydrate	4	10	16	19	11	20
68412-54-4	alpha -(nonylphenyl)-omega- hydroxy-poly (oxy-1,2-ethanediyl), branched (Nonylphenol, branched, ethoxylated)	16	23	23	6	4	3
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	18	10	7	13	12	13
79-01-6	trichloroethylene (TRI)	19	14	8	11	11	8
98-83-9	2-phenylpropene	18	18	12	13	3	4
Other		732	1089	1029	1726	1684	1723

B3. Products (other than energy goods) contributing most to emissions from other sectors than manufacturing industries, by hazard category, 2002-2007. Tonnes emitted

The products are sorted based on their cumulative emissions from 2002-2007. A complete list of the product type codes are given in Appendix A4. For confidentiality reasons, some high-volume product types had to be included in "Other" within each hazard category.

Product type	2002	2003	2004	2005	2006	2007
CMR						
Solvents (O15)	138	149	221	206	211	151
Paint and varnish (M05)	181	247	158	137	137	125
Biocides (B15)	52	39	51	53	203	211
Adhesives (L10)	45	44	58	53	56	53
Binding agents (B20)	44	45	43	52	47	44
Paint and varnish removers (M10)	46	45	41	38	38	49
Cleaning products (R10)	47	38	39	35	38	30
Construction materials (K35)	111	34	10	12	2	2
Impregnation (I05)	58	69	20	18	1	1
Anti-freezing agents (A40)	48	66	4	8	16	9
Hydraulic fluids (H10)	12	11	12	13	11	10
Laboratory chemicals (L05)	7	11	10	11	13	12
Filling agents (U05)	8	11	9	10	11	7
Rust inhibitors (R20)	2	3	6	5	10	15
Polishing agents (P10)	10	3	7	2	5	5
Other	31	40	37	17	15	24
Chronically toxic						
Solvents (O15)	134	145	214	203	207	147
Paint and varnish (M05)	66	60	48	54	63	62
Adhesives (L10)	44	42	55	51	54	47
Cleaning products (R10)	27	9	6	7	6	4
Paint and varnish removers (M10)	3	6	3	4	7	15
Laboratory chemicals (L05)	4	4	5	5	5	6
Other	54	53	94	98	103	311
Sensitising						
Paint and varnish (M05)	818	969	928	731	563	333
Biocides (B15)	53	49	136	167	294	259
Binding agents (B20)	84	83	217	69	168	175
Flooring materials (G30)	111	92	87	100	131	150
Filling agents (U05)	82	92	94	110	112	124
Cleaning products (R10)	42	33	52	49	57	50
Hardeners (H15)	45	46	50	41	41	41
Adhesives (L10)	46	49	40	41	47	26
Impregnation agents (I05)	24	10	93	47	26	7
Insulation materials (I15)	27	26	29	31	37	39
Construction materials (K35)	64	17	18	23	22	9
Process regulators (P15)	17	26	23	35	1	0
Biocides (B16)	0	0	0	25	25	25
Colouring agents (F05)	2	2	1	2	2	57
Solvents (O15)	1	2	12	6	20	11
Other	83	40	43	19	14	37
Dangerous for the environment						
Biocides (B15)	477	319	647	987	1086	991
Paint and varnish (M05)	290	342	300	228	251	194
Cleaning products (R10)	187	156	158	145	156	149
Construction materials (K35)	97	67	89	96	88	84
Colouring agents (F05)	66	82	49	52	57	127
Impregnation agents (I05)	30	15	284	60	35	9
Flooring materials (G30)	58	61	59	72	77	80
Binding agents (B20)	40	33	192	28	13	24
Adhesives (L10)	34	31	34	42	40	44
Hardeners (H15)	31	37	35	28	33	26
Filling agents (U05)	12	26	21	30	41	26
Biocides (B16)	3	1	1	36	36	36
Process regulators (P15)	17	26	24	35	1	0
Solvents (O15)	13	8	16	11	23	17
Laboratory chemicals (L05)	9	18	8	11	9	11
Lubricants (S45)	18	8	9	13	8	8
Polishing agents (P10)	9	4	8	9	10	11
Other	48	48	93	105	104	100

B4. Substances contributing most to emissions from sectors other than manufacturing industries, by hazard category, 2002-2007. Tonnes emitted

The substances are sorted based on their cumulative emissions from 2002-2007. For confidentiality reasons, some high-volume substances had to be included in "Other" within each hazard category.

CAS	Substance name	2002	2003	2004	2005	2006	2007
CMR							
108-88-3	toluene	276	261	332	317	338	279
50-00-0	formaldehyde	60	64	74	54	208	223
96-29-7	2-butanone oxime	61	71	71	53	45	32
75-09-2	dichloromethane	55	55	59	50	47	46
149-57-5	2-ethylhexanoic acid	67	74	20	25	36	29
584-84-9	4-methyl-m-phenylene diisocyanate	53	47	43	35	33	34
108-95-2	phenol	25	26	27	32	30	28
127-18-4	tetrachloroethene (PER)	9	15	10	19	22	19
111-77-3	2-(2-methoxyethoxy)-ethanol	13	9	10	9	8	9
85-68-7	benzyl butyl phthalate	6	6	5	6	11	6
101-77-9	4,4'-methylenedianiline	8	7	6	6	2	1
25154-52-3	nonylphenol	0	7	9	11	0	0
91-20-3	naphthalene	6	7	3	4	3	4
Other		200	202	55	48	26	37
Chronically toxic							
108-88-3	toluene	276	261	332	317	338	279
111-42-2	2,2'-iminobis-ethanol	6	8	2	4	6	217
108-95-2	phenol	25	26	27	32	30	28
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	10	9	7	12	12	12
101-77-9	4,4'-methylenedianiline	8	7	6	6	2	1
630-08-0	carbon monoxide	2	3	2	1	3	5
67-66-3	chloroform	2	2	2	2	2	2
Other		2	2	47	47	53	47
Sensitising							
85-44-9	phthalic anhydride	524	571	594	447	302	150
101-68-8	4,4'-methylenediphenyl diisocyanate	109	103	108	147	257	281
50-00-0	formaldehyde	60	64	74	54	208	223
2855-13-2	3-aminomethyl-3,5,5-trimethylcyclohexylamine	76	102	82	126	99	107
1085-98-9	dichlofluanid	118	135	126	91	102	11
25068-38-6	4,4'-isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane (Bisphenol-A and epoxy resin)	127	81	83	100	87	99
8050-09-7	rosin	71	66	143	75	63	17
80-62-6	methyl methacrylate	61	60	45	79	64	70
96-29-7	2-butanone oxime	61	71	71	53	45	32
112-24-3	trientine	21	42	200	37	5	5
8006-64-2	turpentine, oil	10	13	71	55	86	48
584-84-9	4-methyl-m-phenylene diisocyanate	53	47	43	35	33	34
26447-40-5	methylenediphenyl diisocyanate	38	23	24	17	34	35
5989-27-5	(R)-p-mentha-1,8-diene	22	12	15	19	29	19
9014-01-1	subtilisin	11	11	14	16	15	15
108-31-6	maleic anhydride	16	15	18	18	10	4
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	10	9	7	12	12	12
26530-20-1	2-octyl-2H-isothiazol-3-one	1	0	1	0	0	50
9000-90-2	alpha-amylase	5	4	8	9	9	11
94-36-0	dibenzoyl peroxide	4	5	9	9	9	10
111-30-8	glutaral	6	6	10	7	9	7
60207-90-1	1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (propiconazol)	4	3	3	10	9	9
140-31-8	2-piperazin-1-ylethylamine	6	7	9	12	3	2
141-32-2	butyl acrylate	4	16	6	3	3	2
101-77-9	4,4'-methylenedianiline	8	7	6	6	2	1
68609-97-2	oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	5	4	4	8	5	5
Other		69	57	49	47	57	85

CAS	Substance name	2002	2003	2004	2005	2006	2007
Dangerous for the environment							
1317-39-1	dicopper oxide	471	300	791	849	994	898
5329-14-6	sulphamidic acid	122	100	130	119	90	91
1308-38-9	chromium (III) oxide	88	80	105	105	115	136
2855-13-2	3-aminomethyl-3,5,5-trimethylcyclohexylamine	76	102	82	126	99	107
1085-98-9	dichlofluanid	118	135	126	91	102	11
25068-38-6	4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane (Bisphenol-A and epoxy resin)	127	81	83	100	87	99
142-82-5	heptane	75	66	57	66	61	68
112-24-3	trientine	21	42	200	37	5	5
8006-64-2	turpentine, oil	10	13	71	55	86	48
584-84-9	4-methyl-m-phenylene diisocyanate	53	47	43	35	33	34
1314-13-2	zinc oxide	12	14	33	32	29	32
2893-78-9	troclosene sodium	25	22	20	19	19	18
85535-85-9	alkanes, C14-17, chloro	11	20	13	22	31	23
5989-27-5	(R)-p-mentha-1,8-diene	22	12	15	19	29	19
127-18-4	tetrachloroethene (PER)	9	15	10	19	22	19
95-63-6	1,2,4-trimethylbenzene	21	17	17	14	13	12
7779-90-0	trizinc bis(orthophosphate)	13	11	16	9	11	15
51580-86-0	troclosene sodium, dihydrate	4	8	14	19	11	16
109-66-0	pentane	8	9	11	18	10	11
731-27-1	dichloro-N-[(dimethylamino)sulphonyl]fluoro-N-(p-tolyl)methanesulphenamide	10	9	7	12	12	12
87-90-1	symclosene	2	7	12	12	9	13
26530-20-1	2-octyl-2H-isothiazol-3-one	1	0	1	0	0	50
9016-45-9	nonylphenol, ethoxylated	3	31	2	2	2	4
7440-66-6	zinc	5	6	8	5	5	14
85-68-7	benzyl butyl phthalate	6	6	5	6	11	6
68412-54-4	poly (oxy-1,2-ethanediyl), alpha -(nonylphenyl)-omega- hydroxy-, branched (Nonylphenol, branched, ethoxylated)	9	12	9	4	3	3
60207-90-1	1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (propiconazol)	4	3	3	10	9	9
Other		110	113	142	183	168	167

Contents of figures and tables

Figures

Tables