



**Guidance in the assessment of:
Diffuse emissions from articles**

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Order No. 510797
Sundbyberg, November 2004
Publisher: Swedish Chemicals Inspectorate
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Guidance in the assessment of:

DIFFUSE EMISSIONS FROM ARTICLES

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Guidance in the assessment of DIFFUSE EMISSIONS FROM ARTICLES

1 Background

The type of chemical dispersal attracting most attention in society has long been point sources where emissions to the environment take place in more or less controlled forms. Over the years, these emissions have been analysed and action has been taken to deal with them, so that these sources are no longer as significant as they used to be. As a result, other types of sources are emerging as increasingly important instead.

One source of significance is various materials that exist in society in the form of raw materials and consumer articles. Chemicals can leak out (be emitted) from these at varying rates. These are also known as “diffuse emissions”. Knowledge of diffuse emissions today is limited. A complicating factor in assessing diffuse emissions is that they are often extensive in both time and space.

The purpose of this report is to provide guidance and disseminate knowledge on diffuse emissions, which may be needed when the chemical risks with articles are to be assessed.

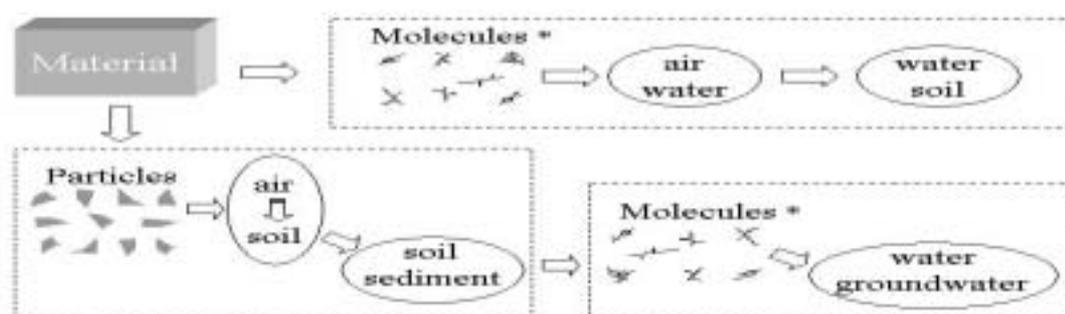
2 Types of emissions

Diffuse emissions can arise from virtually any type of material, such as plastics, rubber, leather, textile, glass, concrete and metal. The way in which chemicals can emit varies. Diffuse emissions can be classified into five different groups:

- 1) Release and dilution in surrounding **air**
- 2) Release and dissolution in surrounding **liquid** (usually water)
- 3) Release and dissolution in surrounding **solid material** (by diffusion)
- 4) Release in the form of **material particles** to various surroundings (e.g. due to wear)
- 5) Release as **breakdown product** to various surroundings (as per points 1 - 4 above)

In the first three groups, the chemical is emitted in molecular form. In the fourth group the chemical is emitted in the form of particles of material. The particles may be assumed to have the same composition as the original material.

Figure 1: Different routes of environmental distribution for a chemical from a material.



* including molecules of any breakdown products

2.1 Molecular emission

Unlike chemical products and preparations, chemicals in other types of articles are bound considerably more tightly to a solid material (known as a matrix). The degree of binding varies according to the combination of chemical and material, from being loosely inserted into a polymer structure to having a strong chemical bond. In more readily mobile cases where the matrix is often organic, smaller molecules can move around the material by a process known as diffusion. Examples of chemicals with such behaviour are plasticisers, flame retardants and biocidal agents in various plastics. The force driving diffusion is that the chemical is striving for an even concentration in the whole material. If the concentration of an added chemical falls locally in a part of the material, e.g. through evaporation from the surface, this can lead to migration of the chemical in the material to restore the concentration equilibrium. Liquid chemicals are generally more mobile than solid ones.

The diffusion rate can be estimated for a homogeneous material. It has been found, however, that when plastic is aged for example by sunlight or heat, the diffusion properties of the polymer can undergo significant changes. This affects the material surface in particular. For PVC, for example, sunlight causes that the material may diffuse more easily whereas high temperatures can lead to the opposite. These phenomena can be partly counteracted by various stabilising chemicals. These manifestations can vary for different types of polymers.

The impact of ageing may vary considerably with the surrounding environment. This makes it more difficult to generalise. The tendency towards emissions should, therefore, where necessary be investigated on a case-by-case basis. If there is a need to analyse this more closely, valuable knowledge on ageing ought to be available from many manufacturing companies and research institutions.

The material-carrying chemical (matrix) may also be of interest for risk assessment. It is useful to have a clear understanding of what type of binding occurs when assessing emissions from a solid material. No molecular emission normally occurs for the most strongly bound chemical fraction, usually polymers themselves. There are, however, exceptions where materials over the course of time are spontaneously broken down to more mobile forms. Processes of this kind may also arise through various types of effect, e.g. heating and exposure to light. This phenomenon can be utilized to create a controlled release of a chemical from a material. One important example is biocides covalently bound to the polymer matrix. A predesigned degradation of the polymer will then cause a continuous release of the biocide during the whole service-life of the material.

Pure metals (including alloys) have a more homogeneous composition. No significant mobility occurs inside the material. The emission is therefore oriented towards the surface, for example through corrosion or wear.

Chemicals that are added to material with a long life are often characterised by low solubility in water and low vapour pressure (e.g. semi-volatile chemicals). If the material is not to be exposed to water, however, water-soluble additives may occur. Examples of this are certain colorants in paper.

Another type of molecular emission of significance is when a chemical slowly penetrates (diffuses) from one material into another. This occurs particularly when materials are joined tightly together. A common area where this is relevant is components in adhesives and jointing compounds that can migrate to the material that is bonded together. To take an example, PCBs in sealing material for building materials have migrated into surrounding concrete to a significant extent. This process is also relevant to foods, where chemicals can migrate from packaging material to the food. It is obviously important to be aware that a chemical can behave in this way when assessing chemical risks. Workers

involved with the handling of waste in particular likely needs to be informed that apparently non-hazardous material may have become contaminated, not just from the point of view of hazards in the working environment but also to avoid recycling the material into society.

2.2 Emission in particle form

Chemical additives in a material (e.g. polymer) may be dispersed to the surroundings if the material has been wholly or partially disintegrated during its service life so that particles of material are formed. This often happens in connection with processing, wear (e.g. brake pads), natural ageing of the material or corrosion.

A type of handling of articles that locally can result in significant formation of particles is the processing of building materials. Particles may be formed here for instance in cutting, welding, grinding and drilling of structures consisting of metal, concrete, plastic, glass etc. Particle size is generally larger in new construction than in maintenance work, where the grinding of larger surfaces in particular is more common.

The mechanisms for this type of emission differ substantially from what applies to molecular emission. Here physical factors in the material play a significantly greater role than the inherent properties of the chemical. Particles that are heavier than water such as pieces from metal corrosion, for example, may rapidly sink to the bottom of watercourses while particles that float readily stay at the surface. Accumulations on water surfaces can then rapidly build up as a result of wind or flowing water to produce significant local concentrations along exposed shores and banks (e.g. soot particles).

Chemicals enclosed in particles of a material are largely isolated from the surroundings, at least temporarily. This has the consequence that they are not equally biologically available. It can generally be said that such chemicals have lower bioavailability and consequently a reduced acute toxic effect. Bioavailability may, however, change if surrounding environmental factors affect the material particle so that it erodes, corrodes or is dissolved. The smaller the particles are, the faster the chemical content can escape. In the absence of specific dispersal data, however, it should be assumed for the sake of safety that bioavailability has not decreased due to the presence of particles, at least when the particle size is relatively small.

Depending on the situation, it may be appropriate to follow the fate of particle emission more closely. There may be a need, for example, to estimate the molecular emission from the particles. For that, it is important to know how the particles are dispersed and in what environment they finally end up. It is necessary to be aware here that the microbial breakdown of particle-dispersed chemical is probably overestimated (compared with molecularly emitted chemical). This is due to the fact that standardised bioavailability tests can give misleading results as they are done with pure chemical. To take an example, wear particles from plastic flooring may contain readily degradable substances that are not broken down in a wastewater treatment plant as they are enclosed in the plastic particles. When the particles then end up on arable land (via the sludge), they may leak out over the course of time.

2.3 Emission of degradation products

When the life-cycle of a chemical additive in society is followed, it may be found that its concentration in a material decreases over time. This phenomenon can be explained by the fact that the chemical has either been transported out of the material or has been converted/broken down. In research on building materials, emission of brake down products is known as “secondary emissions”.

Degradation in a material may arise as a result of a number of causes such as:

- High temperatures
- Spontaneous degradation
- Reaction with other substances in the material:
 - i. that were present from the start
 - ii. that have been formed through degradation processes
 - iii. that have penetrated the material over the course of time (water, oxygen etc.)
- Effect of light or other radiation
- Biological breakdown (in more open material structures)

Examples of degradation products are readily eroded lead oxide which is formed on the surface of metallic lead, such as lead flashing on chimneys and lead shot, and isocyanate which is formed in the heating of polyurethane foam plastic (e.g. in ironing on an ironing-board).

Another example is the emission of 2-ethylhexanol to air from flooring material. 2-Ethylhexanol is formed when an adhesive that fixes plastic carpets on concrete is broken down. The breakdown is caused by moisture from the casting phase being made alkaline by the concrete material. The alkaline moisture then reacts with adhesive components so that they are broken down.

In cases where there is reason to believe that harmful degradation products can be formed, these too should be taken into account in an assessment of dispersal. This presupposes, however, that the degradation products can be emitted.

3 Emissions in different stages of the life cycle

The emissions from articles can be classified into four phases:

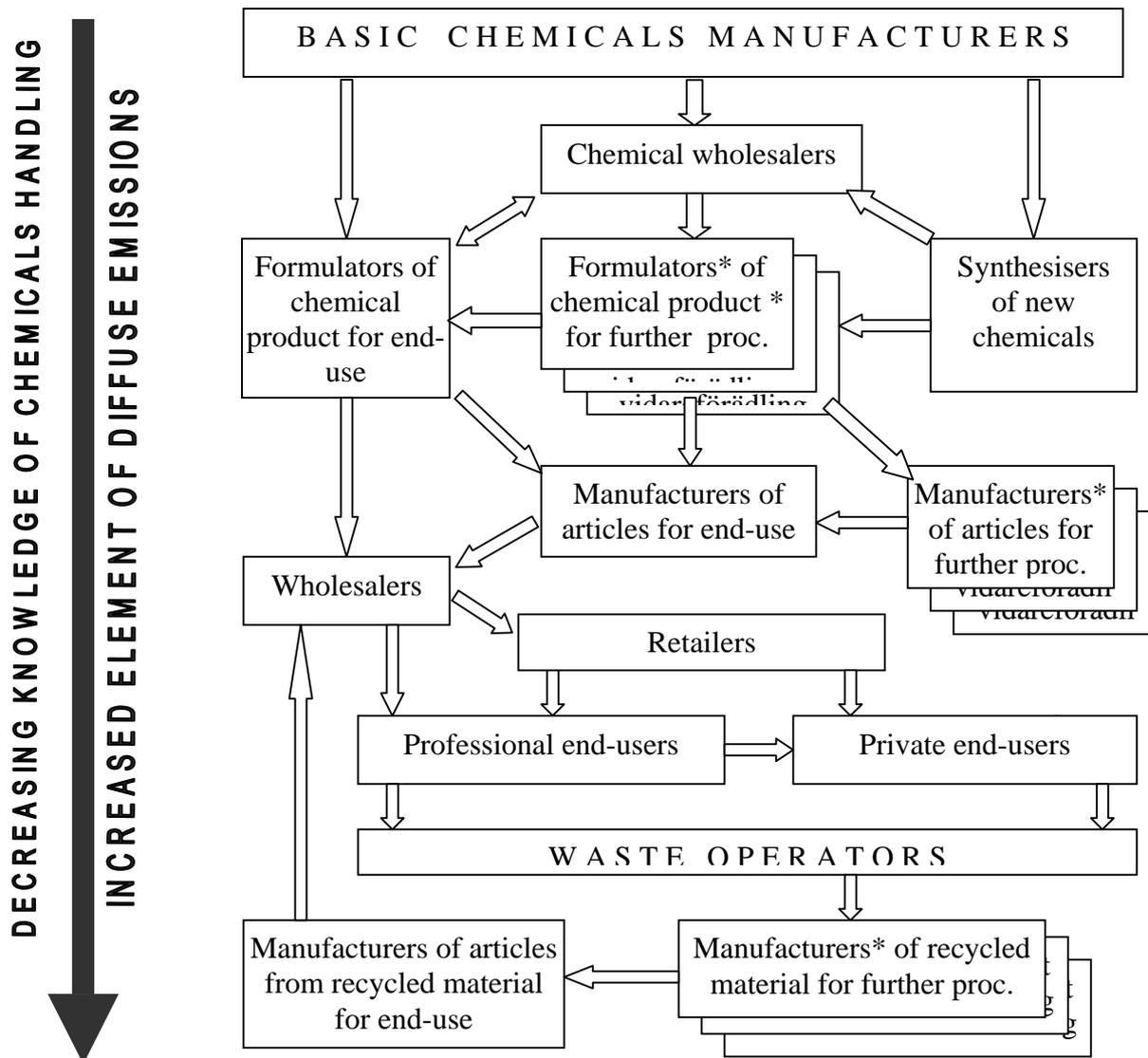
- 1) **Material manufacturing:** Initial emission of mobile chemical additions. These are often residues from the manufacturing stage and normally do not fulfil any further function in the final article. Examples: semi-volatile solvents, water-soluble surfactants, excesses of unreacted binder, surface-treatment waxes, oils. The emissions, which are mainly in molecular form, normally decline with time (weeks to months).
- 2) **Material processing:** Emission through processing of material takes place principally in the manufacturing of articles but also in repair. The emission is usually in the form of material particles. Examples are grinding dust and sawdust of various types of materials such as plastic, wood, metal etc. Gases formed in the heating of materials (welding, melting together).
- 3) **Use:** During use a material ages and emissions often occur in the form of particles. Leaching of water-soluble chemicals may also occur. Unlike the previous type of emission, this takes

place throughout the service life of the material. When the outer endurance limit of the material starts to be reached, an increase in emissions can be expected. Examples are corrosive metals, crumbling cladding on buildings, peeling paints and worn-off floor particles (plastic, paint, brake pad, road surface).

- 4) **Disposal:** When the material has reached the end of its life, there are a number of additional alternative types of emissions that depend on the choice of disposal strategy. Disintegration of the material is usually included. This means that the emitting surface area increases. The energy supplied in disintegration may also temporarily cause the vaporisation of substances of low volatility. The finer the disintegration, the greater the possibility of emission. When very small particles are formed, “dusting” is a further dispersal phenomenon. In incineration, chemicals can be broken down, dispersed with flue gases and/or end up in various waste fractions such as ash, slag, washing water and flue-gas filters. In landfilling, the material is generally exposed to water, microorganisms, erosion and elevated temperature, which may increase chemical emissions. Increased recycling of material signifies increased residence time in society, which can lead to new emission scenarios.

The further down in the manufacturing process one goes, the greater the tendency for point emissions to change to diffuse emissions (see Figure 2). Volatile substances rapidly leave the product while the less volatile ones continue to emit. Another tendency is for raw materials to be worked into increasingly complex constructions. This means that knowledge of chemical content is becoming increasingly difficult to pass on through the chain of consumption.

Figure 2: Different consumers of chemicals in society, known as “downstream users”, viewed from the perspective of the chemical manufacturer.



* further processing may be divided between more than one player.

4 Controlling factors

Articles/materials are dispersed in society through trade and use. Unlike the dispersal of diffuse emissions, the distribution of articles is controlled by society, for example through production volumes, marketing and recommended areas of use (see Table 1). As diffuse emissions are so closely associated with articles, this means that knowledge of the dispersal of articles in society may be an important basis for the assessment of chemical risks.

Table 1: Dispersal of chemicals in society.

TYPE OF DISPERSAL	CONTROLLING FACTORS
Product dispersal: - manufacturing - distribution - use - waste management	Production volume Import/export Marketing Areas of use (dispersal in space) Residence time in society (dispersal in time) Prevailing waste-management strategy (landfilling, incineration or recycling)
Substance dispersal: - from articles - to different environments	Inherent dispersal properties of the chemical: - e.g. vapour pressure, water solubility, melting point. Properties of the article, e.g. - properties of material (e.g. density and porosity). - area/volume ratio. Ambient factors, such as. - climatic impact (indoor-outdoor, winter-summer) - conversion/breakdown.

5 Assessments of exposure

In cases where handling may be suspected as causing diffuse emissions that expose objects meriting protection in an uncontrolled manner, this may need to be examined more closely. Exposure may either be identified via cases where, for example, measured concentrations/effects have been noted, or be estimated via theoretical calculations.

5.1 Analysis of use

If it is suspected that an exposure is due to diffuse emissions, there may be a need for a relatively detailed picture of the use of chemicals. This knowledge is, however, often inadequate. Available analyses of dispersal in risk assessments are therefore rarely comprehensive. Normally only the handling of large volumes is emphasised. If the chemical ends up in a semi-finished product material, the track often stops here. Its continued fate in more or less complex articles may therefore require supplementary investigative efforts.

The consumption phase is the part of the life-cycle most closely associated with diffuse emissions. The reason is that the article normally stays in this life-cycle stage for a long time, and consumers

represent an exposure group. Limited knowledge of chemical risks among consumers further reinforces the significance of this life-cycle stage.

The disposal of end-of-life articles is generally inadequately analysed. One reason for this may be that the waste management strategies varies considerably between different EU Member States. It may become appropriate to add disposal information (for example an individual country or the whole of the EU).

Waste management primarily entails point emissions (e.g. refuse incineration, leachate from landfills). The link to diffuse emissions occurs principally in connection with the recycling of material (see “5.7. Waste management”).

5.2 Identifying emission sources

It is not always easy to identify the source of a diffuse exposure. Chemicals with a broad and prolonged area of use in particular may show very complex patterns of dispersal. Industrial handling is often assessed as a point source for chemical emissions. However, there are large quantities in industry stored in the form of equipment, buildings and associated infrastructure (pipes, roads, drains etc.). This makes it often difficult to distinguish diffuse emissions from point emissions.

If it is known that the chemical occurs in an article material, knowledge should be obtained on its tendency towards emissions. If the way in which it is bound is not known, it can be assumed initially as a worst-case scenario that the chemical can wholly or partially leave the article. The possibility that other knowledge may mean that high or low emission can be ruled out must obviously be left open. High emission is less likely, however, if the function of a chemical additive suggests that it is needed in the article throughout the article’s service life. Conversely, functions that are only important for the manufacturing stage may suggest the converse situation.

The source of measured concentrations of anthropogenic substances in the environment may be more or less unknown. Several sources may be involved. Complex scenarios with elements of both point sources and diffuse sources may sometimes be relevant. In many cases it is difficult in an exposure scenario to define an emission source as a point emission or a diffuse emission.

Distribution analyses in available risk assessments are not always sufficient to obtain a satisfactory picture of potential sources. Supplementary studies may therefore be necessary for article emissions. The biological availability of a chemical generally varies between different forms of dispersal. Knowledge of this is, however, often scanty. It may, for example turn out that the quantitatively largest release is in the form that has low bioavailability, while a smaller release is in a form that has high bioavailability. In the absence of knowledge on bioavailability, a worst case assumption should be taken as a point of departure, i.e. it should be assumed that the availability is high.

5.3 Assessment of residual-concentration data

The interpretation of chemical analyses of environmental samples is complicated if the chemical is present in small material particles. The chemical content may be more or less available for chemical analysis and the measured concentration may be greatly dependent on the procedure adopted in analysis. There is a need to be particularly observant of this with samples collected close to the handling of material, for example in environments close to built-up areas. It is necessary to be aware of two possible extremes in the assessment of residual-concentration analysis:

- 1) The measured concentration in a sample does not include the quantity of chemical enclosed in material particles (of anthropogenic origin).
- 2) The measured concentration in a sample includes the quantity of a chemical that is enclosed in material particles (of anthropogenic origin).

In the first case a chemical flow is missed, i.e. there is a risk of underestimating the extent of a chemical exposure. In the second case, the tendency towards exposure to the chemical may be incorrectly assessed if the form the chemical is unknown. For example, a particle-bound chemical can be expected to be less bioavailable and less subject to breakdown compared with if it was dispersed molecularly.

Decisive factors for the extent to which the particulate fraction is included are probably the chemical analytical methodology selected and the chemical nature and size/shape (area/volume ratio) of the material.

If there is reason to believe that available residual-concentration data may partly have their origin in diffuse particle emission, this should be identified as an uncertainty and taken into account in the final assessment. Particulate dispersal in the external environment should be considered, for example, in assessments of dispersal via the atmosphere and water. In the indoor environment, consideration should also be given to inhalation of material particles as an exposure route.

If the use of a chemical with a long life is still in its build-up stage, there should be an awareness that measured concentrations in the environment have not reached their maximum level (see below: “Cumulative quantities of articles”). Comparisons with calculated PEC values in such situations should be made with a certain degree of caution.

5.4 Estimation of emissions

The emission from article material may be expected to be proportional to surface area. Unfortunately, data on emission per unit of surface area are sparse. In addition, it is not always possible to estimate the total surface area of emitting materials. It may instead prove necessary to use weight-based emission factors (see for example in the TGD, A-table). If it is known that the studied material can occur in articles that have a relatively large emitting surface area per unit of weight, this is obviously an important factor to take into account in an assessment. For some defined scenarios there may be documented emissions material that have been drawn up and that help to quantify emissions in more detail (see Chapter 7 of the TGD). There is a need to be aware that emission factors in the literature may be based on a mean value for the service life of an article. For an article with a long service life, it

should borne in mind, however, that the emission may show significant variations during its service life.

5.5 Types of articles

Diffuse emissions can be expected to arise from all types of materials. The extent to which this happens varies, however, depending on material properties and chemical content and how the material is handled.

Articles may have a simple construction or be composed of a large number of materials, such as plastic, metal, glass, ceramics etc. The articles are dispersed to a greater or lesser extent in society during the various stages of their lifecycle (see Table 1). Some are dispersed initially, such as building materials, computers, furniture etc. Others are in movement during the greater part of their service life, such as newspapers, cars, packaging materials etc. The mobility of the article in society obviously affects the total picture of dispersal for an emitted chemical.

Examples of groups of articles that are important in the assessment of diffuse emissions are building materials, textiles, furniture, electronic equipment and modes of transport. These have long residence times in society, proximity to objects meriting protection and are consumed in large quantities. The element of materials with long lives is, for obvious reasons, large in this group.

5.6 Cumulative quantities of articles

In classical risk-assessment methodology, the time of exposure is generally linked to the statistics of the amount for one whole year (production, consumption, emission etc.). This applies when emissions occur close together in time (within about one year from the time of production). This is often the case for point source emissions. If the residence time of a chemical in society is longer than one year, an accumulation arises in principle, i.e. the actual quantity of the chemical in society is greater than the quantity added annually. The greater the residence time, the greater the accumulation.

It is important to be able to estimate the accumulation of a chemical that shows diffuse emissions since the emission is greatly influenced by the total quantity of article. If an article has been in use for a prolonged period of time, with fairly constant consumption (with regard to volumes and areas of use), it is likely that the maximum cumulative quantity has had time to become established. At this stage, the annual quantity removed (by waste incineration, degradation etc.) is just as high as the quantity added annually. It is usually said that the chemical flow in society then has reached an overall equilibrium ("steady state"). The cumulative quantity can be estimated in a simplified manner by multiplying the quantity added by the residence time of the chemical in years.

When a scenario in which accumulation can be expected is to be managed, an assessment should be made as to whether steady state has been reached or not. This is necessary in order to know whether an assessed exposure relates to the present or future. It is also important in accessing whether recently measured concentrations are also valid in a future perspective. An assessment of this type is obviously very rough because of many factors of uncertainty. The more resent a diffusely emitted chemical has been brought on the market, the more like it is that steady state will be in the future. A delaying factor is that it takes time before a new chemical reaches its optimum niche in the market, sometimes several decades. A new chemical first has to out-compete old chemicals/methods and/or build up completely new areas of use. It should be pointed out that even if steady state has been reached, a chemical may,

in time, penetrate new market niches and in so doing cause significant changes in the picture of exposure despite the total consumption volume being changed.

Historical data on quantities are often necessary to place “steady state” correctly in time. Another useful source of information is time series of analyses of residual concentrations from background environments. There is a need to be aware in looking at such data that these can be “interfered with” by point sources. It is necessary to be aware in this context that fluctuations in economic climate can result in misinterpretation.

An accumulation of material that may easily be forgotten, but can lead to significant diffuse emissions, is waste that is not caught by the waste-management system but stays in the environment for a considerable time (“waste remaining in the environment”). Examples are cables and other infrastructural material, rubber particles from automobile tyres and demolished building materials which is used as filling (see “Particle emission” above). It is not the quantity of the annual addition that is decisive but the fact that the residence time for this type of waste is very long. This means in a long-term perspective that significant quantities of chemicals can be stored in the environment more or less loosely bound in materials. If available information does not indicate otherwise, it should be assumed that this can constitute a potential source of emission. Exposed environments for waste of this type is primarily land which is close to built-up areas and sediments where consumers of drinking water and sediment-living organisms in particular may be in the risk zone. In cases where material particles end up in water treatment plants, the arable-land environment is also a relevant dispersal route if the sludge is used as fertiliser.

5.7 Waste management

The strategies for waste management vary greatly between different EU Member States. The dominant waste streams today are waste incineration and landfilling. As various directives on waste are tightened up at the EU and national levels, landfilling will be gradually replaced firstly by recycling and secondly by incineration. Material which at present is incinerated will probably also become the subject of recycling. Recycling means that a chemical is recirculated into society. If recycling means that the material replaces an equivalent new material, this does not signify any increase in volume in society. In other cases it may result in accumulation. One example may be if recycled plastic is used for manufacturing park benches, where the benches would otherwise be made of wood. Recycling of materials can normally be assessed today as having a marginal impact on the extent of diffuse emissions, but when recycling over the course of time increases, these routes of dispersal will become increasingly important.

6 Gathering of information

An important cause of the use of articles in a dispersal analysis is inadequately stems from the lack of suitable sources of information. Providers of information from industry are generally manufacturers of chemicals. In the best case, these have good statistics on the use of the chemical in the first stage of manufacturing (see Figure 2). If the manufacturing of articles has to be covered, there is generally a need to go further down in the production chain to analyse what are known as ‘downstream users’. Here chemical manufacturers often lose their overview, at least in quantitative terms.

Although the chemical manufacturer knows of the use of its chemicals in articles, it is far from certain that there will be access to quantitative data, as these data are generally sensitive marketing

information. It may also be that statistics on use exist in the company's marketing department but that for reasons of secrecy they are not available internally to the person responsible for risk assessment in the company. Confidential statistics may, however, be made available in many cases by structuring or reformulating the data.

Other significant sources of information are organisations that work on life-cycle analysis (LCA), material-flow analyses (MFA) and positive eco-labelling. National and international sector organisations may also be sources of information.

For long-living articles guidance should be obtained on how the quantities vary over the course of time. It is often possible to obtain a historical picture (see also: "Cumulative quantities of articles"). On the other hand, it is not as easy to forecast future development.

7 Aids

Appendix 1 contains a flowchart with structured questions, the purpose of which is to identify whether diffuse emissions are an important component in an assessment situation.

8 Glossary of terms

Emission (of chemical substances): Release of substances from an object. It may be either a material that releases chemicals from the surface or a structure that releases substances from a point (for example from a vehicle exhaust). A substance can be considered to be emitted when it is no longer inside the material. If it is in readily available form on the material surface, it is thus emitted. A borderline case is the formation of metal oxides on a metal surface. If the oxide can be removed easily, it can be regarded as emitted.

Diffuse emission: An emission that cannot be traced to a specific point source. For articles, the emission is often spread over the greater part of the period of use.

Diffuse source: A source that lacks a specific point of emission.

Diffuse exposure: This term can be interpreted in various ways. On the basis of a time dimension, it can be interpreted as an exposure of an object over a prolonged period of time (i.e. regardless of the type of emission source). On the basis of a space perspective, it can be interpreted as exposure from one or more *diffuse sources*.

Flow (of chemicals): This means the intentional mobility of a chemical in society (e.g. transport, trade). Molecular/particulate emission is not included.

Chemical product: Individual chemicals and mixtures of chemicals (normally in the form of liquids or powder).

Consumers: This means people who are end-users (see below) of products/articles.

Service life of an article: The time an article is used in society (normally a mean value). The time during which the article is put aside until it goes for disposal or re-use is sometimes also included. If the re-use relates to the same type of use, this should also be included in the original service life. If the

material is recycled in a different type of use (“recovered”), this is normally not included in the original service life. A new service life is obtained for a new use instead.

Molecular emission: When a chemical is dispersed from a material in molecular form.

Particulate emission: When a chemical is dispersed from a material in the form of a piece of material. This can arise as a result of wear and weathering. The pieces may be anything from microscopic powder to macroscopic pieces. The material may either consist of a concentrate of the chemical (e.g. metal) or be a mixture of different chemicals (e.g. plastic additive + polymer).

PEC values: Predicted Environmental Concentration. Theoretically calculated environmental concentrations of a chemical based on distribution calculations according to TGD (see below).

Private end-users: This means people who do not need to take account of in-depth considerations of chemical safety in using products/articles.

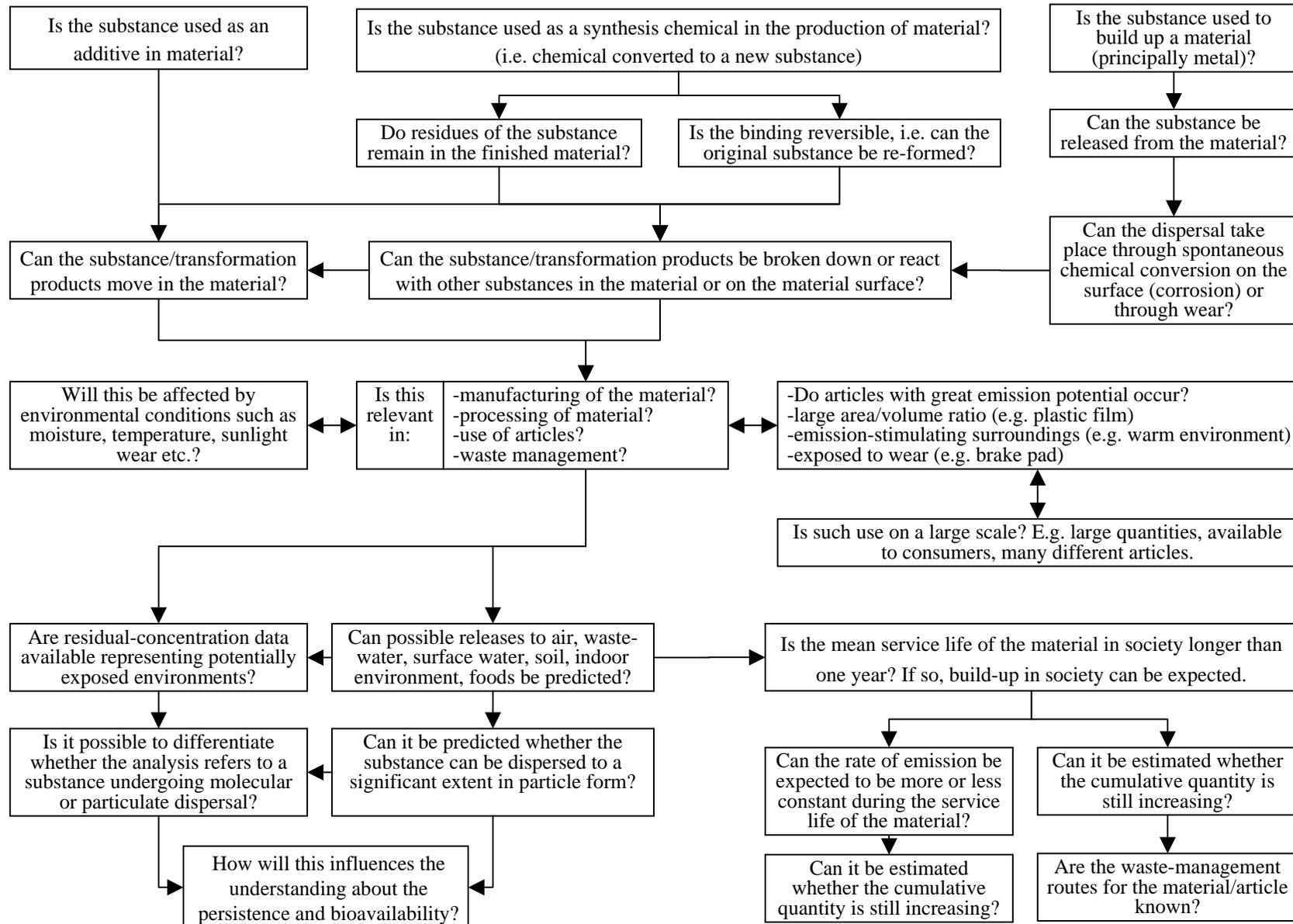
Professional end-users: This means people who particularly in exercising their profession use products/articles in such a way that it may require in-depth consideration of chemical safety.

End-users: This means people who use products/articles at the stage before disposal.

TGD: Technical Guidance Document in support of Risk assessment for “New” and “Existing” chemicals, Commission Directive 93/67/EEC and Regulation (EC) 1488/94. Guide to risk assessment of biocidal agents and common chemicals. Drawn up within the framework of the EU’s risk assessment work (Council Regulation (EEC) 793/93). Can be downloaded from the website of the European Chemical Bureau: “<http://ecb.ei.jrc.it/>”.

Articles: Can be defined in various ways. The term is used here to mean a man-made object whose function is based more on its special shape, surface or condition than its chemical composition.

Appendix 1: The following questions are intended to help in identifying whether diffuse emissions are an important component in an assessment situation.





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