GUIDANCE

Guidance on Information Requirements and Chemical Safety Assessment

Chapter R.12: Use description

Draft Version 3.0
February 2015

1 **LEGAL NOTE**

2 This document aims to assist users in complying with their obligations under the REACH
3 Regulation. However, users are reminded that the text of the REACH Regulation is the only
4 authentic legal reference and that the information in this document does not constitute legal
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Guidance on Information Requirements and Chemical Safety Assessment
Chapter R.12: Use descripton

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European Chemicals Agency

Mailing address: P.O. Box 400, FI-00121 Helsinki, Finland
Visiting address: Annankatu 18, Helsinki, Finland

Preface

This document describes the information requirements under the REACH Regulation with regard to substance properties, exposure, use and risk management measures, and the chemical safety assessment. It is part of a series of guidance documents that are aimed to help all stakeholders with their preparation for fulfilling their obligations under the REACH Regulation. These documents cover detailed guidance for a range of essential REACH processes as well as for some specific scientific and/or technical methods that industry or authorities need to make use of under the REACH Regulation.

The original versions of the guidance documents were drafted and discussed within the REACH Implementation Projects (RIPs) led by the European Commission services, involving stakeholders from Member States, industry and non-governmental organisations. After acceptance by the Member States competent authorities the guidance documents had been handed over to ECHA for publication and further maintenance. Any updates of the guidance are drafted by ECHA and are then subject to a consultation procedure, involving stakeholders from Member States, industry and non-governmental organisations. For details of the consultation procedure, please see:

http://echa.europa.eu/documents/10162/13559/mb_63_2013_consultation_procedure_for_guidance_revision_2_en.pdf

The guidance documents can be obtained via the website of the European Chemicals Agency at:

http://echa.europa.eu/web/guest/guidance-documents/guidance-on-reach

This document relates to the REACH Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006[1].

1 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30.12.2006, p.1; corrected by OJ L 136, 29.5.2007, p.3).

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2 # Document History

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Version	Changes	Date
Version 1	First edition	May 2008
Version 1.1	• The process categories (PROC) related to processing of metals and other minerals were included into the PROC numbering system • SU 10 has been slightly re-phrased • "PC 39, personal care products" have been added • Pulp has been added in SU 6 and a subdivision has been made related to "other" production or services (0-1 for "other economic activities related to chemicals" and 0-2 for "other economic activities, not related to chemicals") • The numbering system of the article categories has been technically streamlined • All "other" has been moved from the last position in the pick-list to the first position	July 2008
Version 1.2	• Correction of numbering from PROC 22 in Appendix R.12-3. • Moving the misplaced cameras and video cameras from AC 9 to AC 3-4 in Appendix R.12-4. • Adaptation of the numbering system in Appendix R.12-4 to the structure of the categories.	October 2008

Version 2	• Improving clarity and consistency of the introduction with regard to the purpose of the use descriptor system.
	• Making more explicit references to Article 37 (DU makes use known to supplier) and section 3.5 of IUCLID in section R.12.1
	• Inclusion of clarifications and definitions in R.12.2
	  • Streamlining the terminology regarding "chemical products" (= substances as such and in mixtures) and articles
	  • Dried/cured mixtures are covered by Article Categories since they have a defined shape and surface.
	• Inclusion of updated examples on how to work with the descriptor system: See Section R.12.4 and R.12.5.
	• Introduction of a new table R.12.1 in order to better explain the relationship between use description and Tier 1 exposure estimates.
	• Adding a short paragraph in section 12.2.1 regarding the different actors in the life cycle of a substance.
	• Harmonisation of the structure of section 12.3.1 to 12.3.5. Inclusion of 3 subsections: definition and scope of the descriptor; guidance on assigning a suitable category; link to Tier 1 assessment.
	• Splitting of the Sector of Use descriptor list into two types of information: Main User Groups in the life cycle of a substance as key descriptor (SU 3, 21, 22) and Sector of End-Use (all entries) as supplementary descriptor, see Appendix R.12-1.
		March 2010

	• More clearly distinguishing of the two functions of the Chemical Product Category (PC) in section R.12.3.2: (i) describing the sectors formulating mixtures by mixture type and (ii) consumer product types that can be assessed with the ECETOC Targeted Risk Assessment for consumers (see Appendix R.12-2.2).
	• More clearly distinguishing between the two functions of the Article Category (AC) in section 12.3.5: (i) Type of article related to service life and subsequent waste life stage of the substance (handling of article by workers and/or consumers) and (ii) consumer article types that can be assessed with the TRA. See Appendix R.12-5.1 and R.12-5.3.
	• Inclusion of a list of product sub-categories addressed in the ECETOC Targeted Risk Assessment (TRA) for Consumers, see Appendix R.12-2.2 and Appendix R.12-5.3, Explaining the link between use description and Tier 1 exposure estimates in section R.12.3.2 and R.12.3.5.
	• Removal of the reference to industrial or professional setting from most of the process categories. The choice can be made in the exposure estimation itself. At use description level, SU 3 or SU 22 indicate, whether a use is expected to occur under an industrial or non industrial setting.
	• Inclusion of examples related to processing of articles by workers into section R.12.3.5. Restructuring of the AC list to allow consistent links to the TARIC system. Removal of definitive sub-categories in the AC list in order to leave it to the registrant and the downstream users to define the level of detail required to describe the service life stage of the substance. The previous subcategories have been converted into examples illustrating which kind of articles may be covered under the broad categories.
	• Introduction of the Environmental Release Category (ERC) as an additional descriptor (see section R.12.3.4). Explanation on the role of SPERCs in this context.
	• Introduction of a new category ERC 12 addressing processing of articles with abrasive techniques by workers in industrial setting. Expanding ERC 10b/11b to also cover removal of substances from article surfaces.
	• Inclusion of a list of substance function categories (for section 1.2 of the eSDS and reporting in IUCLID) in Appendix R.12-6. The purpose of this list is explained in a short paragraph in section R.12.3.6
	• Introduction of a new section R.12.5 with explanation of how the descriptor system can support i) the mapping of uses as the starting point for the CSA, ii) the building of titles for exposure scenarios and iii) the reporting on identified uses in IUCLID section 3.5.
	• Refinements in the pick-lists.
	  • Include i) scientific research and ii) electricity, steam, gas, water supply and sewage treatment into the SU list.
	  • Split out fillers and putties from PC 9 into PC 9b
	  • Split out finger paint from PC 9 into PC 9c.
	  • Clarification that PC14 refers to substances reacting with the metal surface
	  • Remove automotive care products (PC6), artist's supplies (PC5), lawn and garden products (PC22) since it largely duplicates other categories
	  • Remove PC10 since this is covered under "others"	

	anyway. • Clarification that PC20 refers to processing aids used in the chemical industry • Inclusion of bleaches and other processing aids into PC 26 and PC 34 • Covering metals and other minerals in PROC 21 to 25 plus adaptation of description • Splitting PROC 8 into PROC 8a and 8b • Introduction of PROC 26 and 27a and 27b referring to processes particularly relevant for the metal industry. • Remove AC12 from the AC list since it leads to major inconsistencies with the material based categorisation and creates problems in compatibility with the TARIC system . • Editorial adaptation of the text to the changes listed above.	
Version 3.0	• Guidance scope extended to 'Use description' (rather than only 'use descriptor system') and title adjusted to reflect this • Explanation of the role of use information in various processes • Clarification of some terms/concepts/requirement such as o Concept of use / contributing activities o Scope of Life cycle stages including differentiation industrial/professional o Obligation to include use information in the registration dossiers • List of use descriptors: o New use descriptor: Life cycle stage replacing main user groups SU 3 (industrial uses), 21 (consumer uses), 22 (Professional uses), 10 (Formulation) o Life-cycle stage 'Formulation' renamed 'Formulation and re-packing' to make clear its scope o 'Professional uses' renamed into 'Widespread uses by professional workers' to clarify the fact that these uses are considered as widespread from the environment point of view. o Main user groups removed from SUs as covered by new use descriptor 'Life cycle stage' o Removed PC19: intermediate (covered by Technical function) o Shorter names for PCs o New PC for hydraulic fracturing o PROCs names and explanations adapted to clarify their scope o Clarification of applicability of ERCs by adapting names and explanations o Enhancing the concept of AC sub-categories to bring more specific information on articles o Adaptation of categories for Technical functions on the basis of US EPA proposal for OECD harmonised categories	

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Convention for citing the REACH regulation

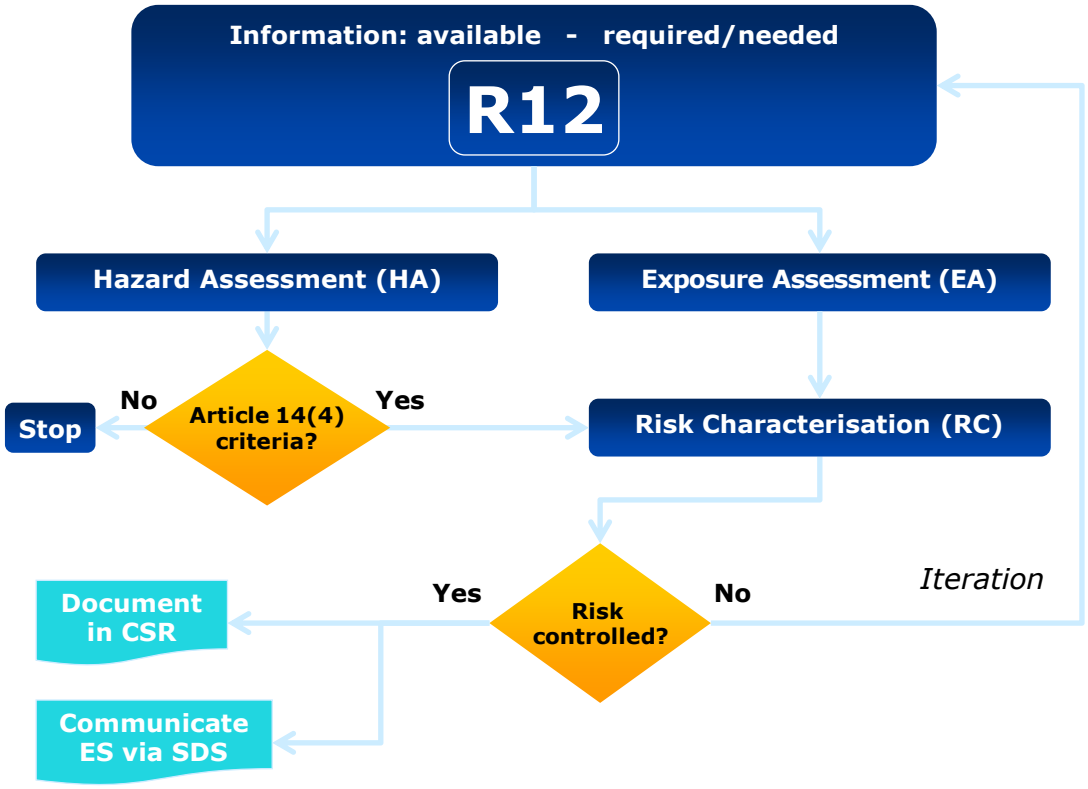
Where the REACH regulation is cited literally, this is indicated by text in italics between quotes.

Table of Terms and Abbreviations

See Chapter R.20

Pathfinder

The figure below indicates the location of chapter R.12 within the Guidance Document



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R.12.1. Introduction

R.12.1.1. Aim of this guidance

The aim of this guidance is to explain the role the use description plays in different REACH processes, to explain the related legal requirements and the principles for describing the uses of chemical substances.

Under REACH each manufacturer and importer of a substance is obliged to provide a brief general description of the identified uses in his registration dossier. A use in this context means any utilisation of a substance as such or in a mixture[2]. This includes for example: formulation of mixtures, or production of an article[3].

The description of uses is a key pre-requisite for the registrant's safety assessment (where required) and the subsequent communication of the conditions of safe use down the supply chain. The description of identified uses is also meant to enable the authorities to understand what is practically done with a substance in the market. This supports well informed decisions on what priority the substance has for further scrutiny and regulatory action(s) by Authorities. And last, some of the information on uses from the registration dossiers is disseminated via the ECHA website to the general public. This enables the general public to have indications on products or articles where substances can be present, as well as processes and sectors that make use of a given substance.

Therefore it is important for all REACH actors (registrants and downstream users, Authorities and the Public at large) to have a common understanding on what the use description in the registration dossier is and what it should contain to best serve its purposes.

R.12.1.2. Who should read this guidance?

The main focus of the guidance is the use description in the context of REACH Registration, although the role of the use description in other REACH processes such as dissemination is also addressed in this document. The description of uses in the context of the application for authorisation is addressed in the ECHA document "How to develop the description of uses in the context of Authorisation" available on http://echa.europa.eu/web/guest/applying-for-authorisation.

This guidance addresses registrants and downstream users as both groups of actors need to communicate with each other to arrive at a meaningful description of uses in the registration dossier and in the extended safety data sheets. Downstream users can also make use of the principles in this guidance in the context of a downstream user report according to Article 38 of REACH.

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[2] Article 3 of the REACH legal text includes a definition of use: "*24. use: means any processing, formulation, consumption, storage, keeping, treatment, filling into containers, transfer from one container to another, mixing, production of an article or any other utilisation*".

[3] Article 3(3) of REACH provides that "*article: means an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition*"

R.12.2. Use description as legal requirement

According to REACH, Registrants are required to provide a "*brief general description of the identified use(s)*" in the technical dossier for all substances for which registration is required (Articles 10(a)(iii) and Annex VI, point 3.5 REACH).

This requirement applies to normal registration (Article 6), registration of intermediate under strictly controlled conditions (Articles 17(2)(e) or 18(2)(e)) or registration of substances in articles (Article 7(1) or (5)) and does not depend on whether a chemical safety assessment has to be performed. It applies to all types of substances (classified/non-classified) and all tonnage bands (including 1-10 t/y).

It should be noted that where substances have been previously notified under 67/548/EEC and where the tonnage band and uses have remained the same as the ones notified, the company is not explicitly required to comply with Annex VI of REACH, but including a description of uses is highly recommended.

There is a clear link to be made between description of uses and exposure assessment. Indeed, in the cases where registrants are required to carry out an exposure assessment in the context of the Chemical Safety Assessment (CSA), consistency between the brief description of the uses in the technical dossier and exposure scenarios in the CSR is required. Registrants who are required to carry out an exposure assessment have to address the manufacture, all the uses of the substance (on its own, in a mixture) and the subsequent life-cycle stages (article service life and waste stage) and to report the outcome in their Chemical Safety Report (CSR). In cases where an assessment is required, safe use should be demonstrated for each use reported.

The description of uses as reported in the registration dossier should therefore provide an appropriate level of information to allow understanding of what is done with the substance, in particular to support a meaningful exposure assessment of the uses. The use description includes therefore the manufacture, any use of the substance as such and in mixtures and any subsequent service-life[4] in articles resulting from a use. The waste stage is not part of the use description.

Use reporting also plays a role for substances with no exposure assessment obligation. Substances manufactured/imported between 1-10 t/y give rise to registration obligations but no exposure assessment has to be performed. Substances manufactured/imported in quantities > 10 t/y, but not meeting the criteria set out in Article 14(4) REACH[5] also do not need to undergo an exposure assessment. Nevertheless, in both cases, registrants have the obligation to include a brief general description of the identified use(s) in the registration dossiers (Annex VI 3.5). In order to do so, they are advised to follow the elements described in this guidance and implemented in IUCLID.

Registrants should also take into account that the obligation to submit in the technical dossier 'all information available to the registrant' applies. E.g. registrant is in possession of description of uses from the joint submission. He should include those that are relevant to him with the available level of detail.

In case where registrant has used use information for adaptation of the information requirements based on exposure/release considerations, or for selecting an appropriate route of administration according to REACH Annex VII-X column 2, use information (as well as corresponding exposure information) should be detailed enough to justify the adaptation; for

[4] Service life means the period of time an article remains in service or in use.

[5] Please note that in the rest of the Guidance, these criteria will be refered to by using the term"hazardous".

example, where the registrant wishes to waive higher tier human health end-points based on strictly controlled conditions (REACH Annex XI 3.2, and more specifically for substances incorporated into articles Annex XI 3.2(c)).

Where information gaps impact on the ability to establish whether or not a classification criterion is met, the registrant should detail his use description to the extent that would be appropriate for a substance considered to be hazardous.

In the case of intermediates, as for other substances, a description of the use needs to be provided in the registration. Information included in registration dossiers on the use as intermediate and on the share of the total tonnage for that use are particularly relevant for authorities when substances are to be selected and prioritised for further regulatory actions (e.g. inclusion in the authorisation list, restrictions etc.) and when deciding on the best regulatory risk management option.

If a registrant fails to report information on uses without valid justification, he can be requested to provide such information in the context of compliance check.

It should be noted that members of joint registrations have to provide a brief description of uses and cannot simply refer to the dossier of the lead registrant, even if the CSR has been submitted jointly. According to Article 11, each registrant shall submit separately the information specified in Article 10(a)(iii) i.e the information on the manufacture and uses(s) of the substance. The information provided should represent the uses of the registrant and of his own supply chain.

R.12.3. Role of the use description in different processes

The use description plays an important role for many different actors, including:

- Registrant's requirement to perform a chemical safety assessment. Registrants who are required to carry out an exposure assessment in the context of the Chemical Safety Assessment (CSA) have to address all identified uses of the substance and to report the outcome of the chemical safety assessment in their Chemical Safety Report (CSR).

- Suppliers of hazardous substances or mixtures that have to provide the recipient with a safety data sheet (SDS) according to Article 31. The SDS has to include use information.

- Downstream user's (DU) obligations: DUs can communicate their use to suppliers. They also have to check whether their use is covered by the exposure scenario (ES) they receive. In case they carry out their own CSR, the brief description of the use is part of the information to be reported to ECHA.

- Authorities' tasks include the selection and prioritisation of substances for further regulatory processing e.g. Substance Evaluation, identification of Substances of Very High Concern (SVHC), Restriction, etc. The authorities' screening and prioritisation considers the use of the substance (e.g. wide-disperse characteristic of the use of the substance).

- General public's access to information on the use of chemicals: non confidential information on uses is disseminated.

It is therefore important to understand the purpose of the use description in order to better understand the necessary information to be collected and reported. The role of the use description in different processes is further detailed below.

R.12.3.1. Use description as part of the registration dossier and as a basis for the exposure assessment

Registrants who are required to carry out an exposure assessment in the context of the Chemical Safety Assessment (CSA) have to address all the uses of the substance (as such, in a mixture or in articles) happening in the EU and to report the outcome of the chemical safety assessment in their Chemical Safety Report (CSR). The use description plays a crucial role in this process as it is the basis to ensure a meaningful and complete exposure assessment. The CSR for hazardous substances includes Exposure scenarios that define the conditions of use that ensure control of risks associated with the uses of the substance throughout the life-cycle of the substance.

As a first step of the assessment, registrants need to identify all the uses of their substances including realistic information on the corresponding conditions of use. An efficient way for a registrant to get such information is to retrieve it from *use maps* developed by Downstream user sector associations[6]. *Use maps* provide a brief description of the main uses relevant for the sectors and information on conditions of use that are typical in the sector and should be used as input for their registrations in particular the chemical safety assessments.Such a mapping of uses within a market sector can be reused for a range of substances ending up in that market.

More information on use maps can be found in the action area 2 of the CSR/ES Roadmap website: http://echa.europa.eu/csr-es-roadmap

The uses covered in a registration are to be included in the technical dossier. The dossier is compiled and submitted in a IUCLID format. A specific section 3.5 is designed to include the use information for the various life cycle stages relevant for the substance.

Exposure scenarios are then generated for each use by the registrant while performing the CSA. The Exposure scenarios in the CSR and the identified uses described in the technical dossier have to be consistent. They should also be consistent with the exposure scenarios that are later on communicated to downstream users in the supply chain (as an annex to the Safety Data Sheet (SDS)).

R.12.3.2. Use description for communication on safe use down the supply chain

Relevant identified uses and uses advised against are also to be listed in section 1.2 of the SDS. Where a CSR is required, the information in this subsection of the SDS shall be consistent with the identified uses in the CSR and the exposure scenarios set out in the annex(es) to the SDS.

It is good practice to include a Table of contents before the annexed ESs in the extended-SDS. This table of contents is composed of the short titles for communication which should give a first indication to the recipient on which ESs are applicable to his use. The ES also includes a title section where a more detailed description of the activities covered by the ES is provided. Both titles and short titles for communication need to be consistent with the information on use in the registration dossier.

Downstream users receiving extended-SDSs check the content of the exposure scenario(s)

[6] Use maps can even be collectively created by several manufacturers/importers in dialogue with downstream sectors.

describing their uses to ensure that their conditions of uses are covered and the risk management measures implemented. An appropriate description on the scope of the use is also key in this process to make sure that DUs recognise their uses and can process the information on safe use communicated in the supply chain.

R.12.3.3. Use description as a basis for Authorities' decision making

Information on use and exposure is to be communicated as part of the registration dossiers to provide authorities with evidence of the safe use of chemicals. REACH is set up so that Authorities can identify whether or not further scrutiny or regulatory actions are needed for some chemicals, on the basis in particular of the information provided with all the registrations.

These processes require the description of uses to be transparent and complete. It also requires the uses described to be unequivocally linked to the exposure scenario in which the conditions for safe use are described.

The level of understanding of the uses required by Authorities depends to a certain extent on the hazard profile of the substances. For hazardous substances (as well as for substances where data gaps on hazard information are identified) it is of particular importance that processes, tasks and activities are described with a level of detail that provides a well-founded basis for assessing e.g. the adequacy/credibility/representativity of the model/assumptions/data used for the exposure assessment and of the conclusions. This can affect both dossier evaluation (see Section R.12.2 above) and substance evaluation Registrants can avoid the administrative effort involved in an evaluation, if they provide a dossiers with sufficient level of detail from the outset.

Once a substance has been prioritised for further risk management measures, the quality of the use description might also impact on the decision by Authorities on the most adequate risk management option. A clear picture on the use pattern of a substance supports Authorities in deciding on actions. The information should include a description of the actors/industry sectors involved, of the types of uses (exempted, already regulated by other regulatory tools), of their related-tonnage, as well as realistic information on exposure. Authorities' actions can then target the main concerns while supporting the efficiency of the whole regulatory process (substances do not get unduly selected for further scrutiny and action due to wrong reasons). It is important to realise that in the absence of complete and consistent information on uses, worst-case assumptions may have to be made during the scrutiny phase which may hamper the efficiency of regulatory risk management..

The REACH database contains a high number of substances potentially of concern considering i) their known hazard profile and/or ii) existing data gaps. Authorities need to concentrate their action by defining priorities among the substances. Selection of substances for further scrutiny, and prioritisation of these substances for further regulatory actions, are based to a certain extent on information on uses provided in the registration dossiers. As an example if industry demonstrates that a given substance is not used in a wide-dispersive manner and it has low tonnage for uses that might fall within the scope of authorisation, this substance will get lower priority during the entire selection and prioritisation process that may lead to inclusion in Annex XIV. In order for Authorities to assess substances against prioritisation criteria, the relevant information should be provided as part of the registration dossier. In addition to being available, the Authorities need this information to be structured in a way that allows comparison among substances and (IT)-processability.

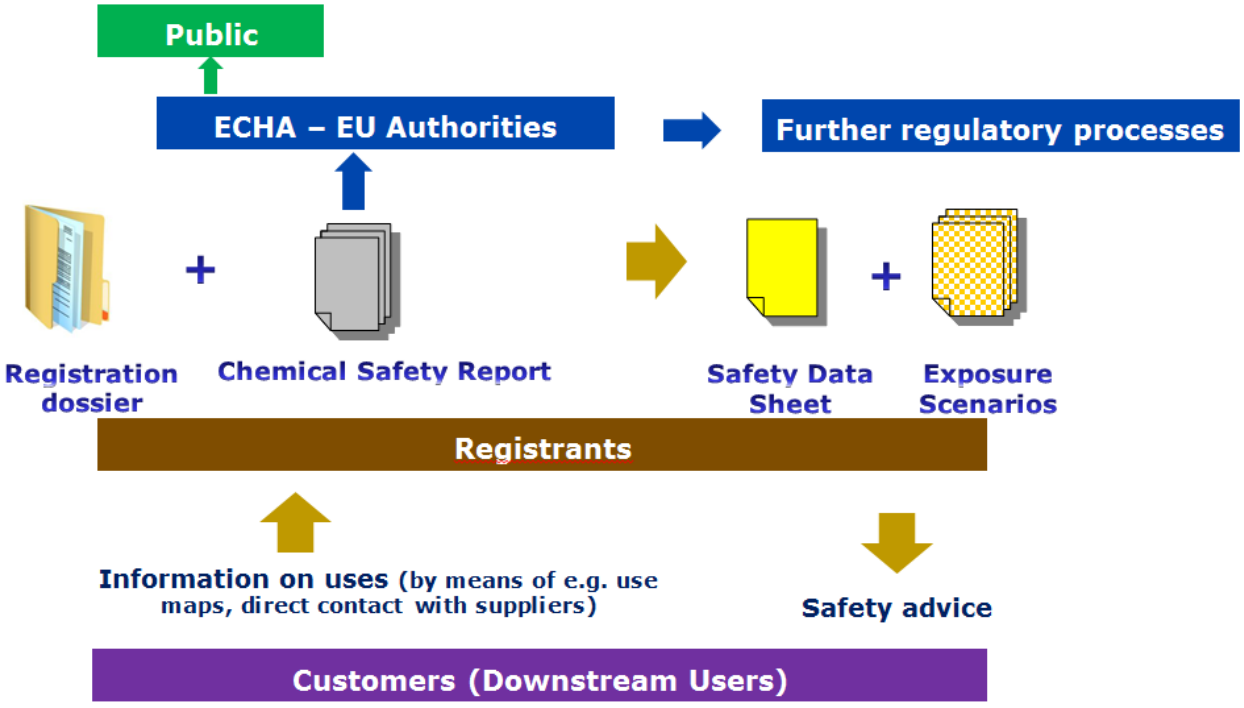
R.12.3.4. Use description for dissemination of information to the general public on the use of chemicals

Information on uses (identified uses and uses advised against) is disseminated on the ECHA website[7] for public information on the registered substances. Therefore the reporting of meaningful and clear use names and relevant use descriptors is of high relevance to ensure an appropriate understanding by the public at large of where the substance is present, as well as processes and actors that make use of a given substance.

R.12.3.5. Overall information flow

The figure below shows the different processes where use information is conveyed.

Figure R.12- 1: Overview of processes where uses play a role



R.12.4. Describing uses

The description of uses of chemical substances should be structured according to the life cycle of the substance. Each life cycle stage can consist of different uses. Each use should be described with a number of elements as explained in section R.12.4.1 and R.12.4.2 below.

[7] http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances

Section R.12.4.3 shows an example of how all the elements come together in a use description..

R.12.4.1. Key elements for describing a use

A description of a use should include the following elements that are further explained in the sections below:

- Life cycle stage
- Use name and brief technical description of use process
- Identification of the markets in which the substance is used
- Contributing activities
- Substance-specific information

In order to facilitate communication in the supply chain, among registrants if applicable, and with authorities, these elements should be standardized as far as possible. The benefits of standardisation are to enhance harmonisation and facilitate IT processing of the information.

The use descriptor system

One means of standardisation is the use descriptors system, which is based on six descriptor-lists with standard entries and codes. It provides categories for some of the key elements of use description. The table below provides an overview on the available categories:

Table R.12- 1: Overview of use descriptor category relevant for each key element describing a use

Use descriptor category	Related key element(s)
Life cycle stage (LC)	Life cycle stage
Sector of use (SU)	Identification of the market
Product category (PC)	Identification of the market, Contributing activities
Process category (PROC)	Contributing activities
Environmental release category (ERC)	Contributing activities
Article category (AC)	Identification of the market, Contributing activities
Technical function	Substance specific information

Some categories are relevant for more than one element e.g. Product category serves both as an identifier of the market of the substance as well as a contributing activity for consumers. More details are given in the sections below.

The lists of use descriptors for each category are included in Appendix R.12.4.

In order to support full understanding of the scope of a use, use descriptors alone are not sufficient. Tools like IUCLID and use maps therefore include free text fields including names for

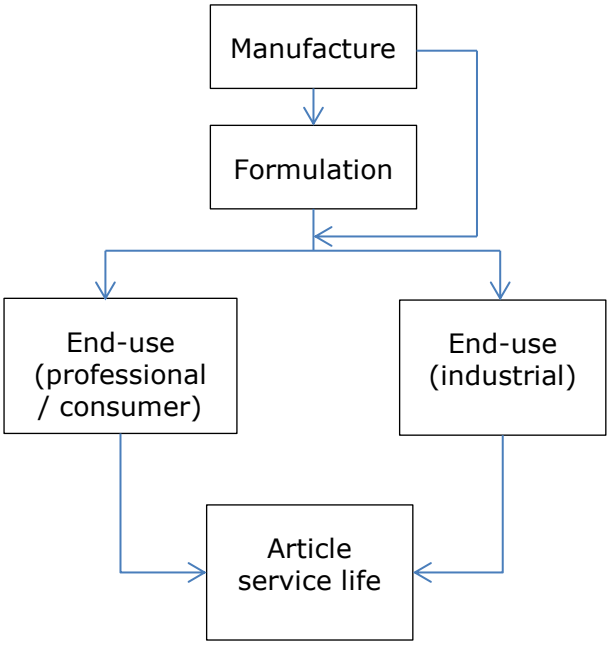
use and contributing activities as well as more specific information on the use process. This more specific information can also be standardised via agreements in the supply chains. The use maps can be used as a vehicle to reach such agreements.

R.12.4.2. Brief explanation on each information element describing a use

R.12.4.2.1 Life cycle stage

The use description should cover the whole life-cycle of the substance, taking into account its degradation/transformation products where applicable. There are four basic steps or stages in the life-cycle of a substance to which a use can be assigned: manufacture, formulation, end-use[8] and article service life as illustrated below.

Figure R.12- 2: Overview of life cycle stages



Each use of the substance can be assigned to one of the life-cycle stages. The life-cycle stages are structured in such a way that they provide an indication of the type of organisations concerned by the use (e.g. formulators, industrial sites, small scale professional activities, consumers) and whether the substance is in an article during the use.

The corresponding use descriptor is the **life cycle stage (LC).**

The life cycle starts with the activities of the first actor in the life of a substance, the

[8] 'End-use' means the use of a substance as such or in mixture, as a last step before the end-of-life of the substance, namely before the substance is consumed in a process by reaction during use (including intermediate use), is emitted to waste streams or the environment or is included into an article.

manufacturer. In the case of an imported substance, this life cycle stage is not relevant. It continues with the description of the activities of formulators, where relevant. Then activities undertaken by different end-users of the substance as such or in a mixture i.e. industrial companies, professional workers or consumers are to be described. The last stage of the life-cycle of the substance to be considered for use description purposes is the end-use or the service life. The waste stage (disposal or recovery operations) is not to be included in the use description; nevertheless it must be covered in the CSA/CSR.

Manufacture

This stage includes processes by which the registered substance is manufactured from raw materials. Operations which are necessary for the handling of a substance on its own in the manufacturing for export or placing on the EU market are considered to be part of the manufacturing stage (e.g. filling into appropriate containers, storage, addition of stabiliser, dilution to a safer concentration -if necessary for transport safety-). If a substance is directly exported after manufacture, all activities with the substance refer to manufacturing and should be reported under this stage.

Formulation and re-packing

A use in the formulation stage corresponds to specific activities meant to produce a mixture to be put on the market. This means that during formulation, the substance is transferred and mixed with other substances. It corresponds to activities taking place at industrial sites. Mixing activities during end use are not to be reported under this formulation stage. Manufacturers' or importers' own formulation should be reported under this life cycle stage.

Chemical distributors' activities such as repackaging (which involves transfer of the substance) are to be covered under the formulation stage even if no actual mixing is carried out. This also applies to importers transferring substances from large containers into smaller containers without mixing.

Note that distribution, assembling of small containers for transport or re-labelling activities without transfer of substance are not to be considered as "uses" and have therefore not to be reported.

Use at industrial site

All end-uses of the substance (as such or in a mixture) carried out at industrial sites can be reported under this life cycle stage.

A use is an end-use when as its result the substance:

- has reacted (therefore it does not exist anymore)
- has become part of an article, or
- has been released via waste water or exhaust air, and/or it is contained in waste from this use.

If the substance becomes part of an article, the subsequent life cycle stage (the service-life) is to be reported as well (see below).

Please note: manufacturers' or importers' own (end)-uses should be reported under this life cycle stage.

Appendix R.12.3 includes some considerations to help to identify whether a use belongs to this life cycle stage or is rather a widespread use by professional workers.

Widespread use by professional workers

Widespread uses by professional workers correspond to uses taking place everywhere (they are assumed to take place in most towns of a certain size) by multiple actors each at low scale e.g. local garage, small cleaning businesses. The further fate of the substance corresponds to the fate as described for uses at industrial sites.

Appendix R.12.3 includes some considerations to help to identify whether a use belongs to this life cycle stage or is rather a use in an industrial site.

Consumer use

All end-uses of the substance as such or in a mixture carried out by consumers can be reported under this life cycle stage. Uses by consumers are also considered to take place in a widespread manner.

Service-life

For a given substance incorporated into an article, the service life is considered to be the period of time an article remains in service (or in use). The term 'service life of articles' is mentioned in Section 5.2.2 of Annex I to the REACH Regulation.

If a substance ends up in articles, the description of the service life of the substance in articles should be provided. The uses leading to incorporation into the article are to be reported in the previous life cycle stages.

Under the service life stages, activities of workers and consumers with certain articles can be described.

For substances remaining in dried coatings, adhesives or comparable mixtures after application in/on the article one or more uses at service life stage are to be reported. Incorporation of substance in buildings and constructions and parts of them should be reported in the same way as for articles.

Substances for sole use as an intermediate should never have any service life described, as by definition they are transformed during industrial use into another substance, which will then potentially be subject to registration obligations.

Articles containing the substance can be used or processed by consumers, by workers at industrial sites and/or by professional workers. This also includes processing of semi-finished articles by workers with the aim of producing finished articles or repair and maintenance work like for example sanding of surfaces.

In some cases, it might not be easy to determine whether a substance is used as a substance or mixture as such (in which case the use should be documented under the formulation, industrial, professional or consumer stages) or whether the substance is an integral part of an article. The ECHA *Guidance on requirements for substance in articles*[9] provides further clarification on the definition of an "article" and decision criteria.

[9] http://echa.europa.eu/support/guidance

R.12.4.2.2 Use name and brief description of use process

Use name

This element provides the information that characterises the nature and scope of the activities covered in a use and allows understanding of what differentiates this use from the other uses of the substance. Use names should not contain long explanations on technical process, conditions of use or risk management measures

A unique name/title of the identified use is to be provided. The unique name/title can include sector specific information to support the understanding of the use for different actors in the supply chain.

Even though this is a free text field in IUCLID, it is advisable that it is described using standard phrases (developed by sectors) as far as possible, in order to ensure consistency between the use name and the title of the exposure scenario to be communicated in the supply chain.

Use names should be limited to key information that helps for example to differentiate one use from another or provide more specificity compared to information provided by the standardised use descriptors.

Use maps include use names agreed at sector level. Therefore they are a good source of harmonised use names to be used in the registration dossier as well as the ES for communication.

Brief description of use process

Additional information may be provided (as free text in IUCLID) to explain in more detail the use from a technical process perspective. This explanation is mainly aimed at authorities undertaking a detailed analysis of the registration dossier for a better understanding of the uses. This element is not intended to be communicated in the supply chain as part of Exposure scenarios, nor disseminated via the ECHA website.

R.12.4.2.3 Market description

This element includes information on where the substance is used (formulating sectors, industrial sectors, types of products, types of articles).

The corresponding use descriptors are:

- The **sector of use category (SU)** describes in which sector of the economy the substance is used e.g. rubber manufacturing sector, glass manufacturing sector, agriculture, forestry, fishery.

- The **chemical product category (PC)** describes in which types of chemical products (= substances as such or in mixtures) the substance is finally contained when it is supplied to, and used by end-users e.g. detergents, paints.

- The **article category (AC)** describes the type of article into which the substance has eventually been processed. This also includes mixtures in their dried or cured form (e.g. dried printing ink in newspapers; dried coatings on various surfaces) e.g. wooden articles, plastic articles.

Please note that not all descriptors are applicable to provide this market information at all stages of the life cycle e.g. sector of uses are not relevant for the consumer life cycle stage

R.12.4.2.4 Contributing activities description

This element covers the description of the different **activities** contributing to one use. Activities have a broad meaning here, covering production processes (or process steps), tasks of workers, techniques, unit operations or activities of consumers with particular consumer products/articles. When defining the different contributing activities, material transfer and maintenance should be considered. See also Appendix R.12.2 on drivers for splitting into uses or activities.

For each use, at least one contributing activity needs to be reported in IUCLID for human health and environment. When an exposure assessment of the use is performed, each of the contributing activities are assessed to demonstrate that their conditions of use are safe. Uses and contributing activities will translate into exposure scenarios and contributing scenarios in the chemical safety assessment.

An example of the relations between uses and contributing activities is presented in Fig. 3 in Section R.12.4.3 below. The following elements should be provided for each contributing activity:

A contributing activity name

The contributing activity name allows for more specificity than the corresponding use descriptors (see below). As for the use name, this is a free text field in IUCLID where the nature and scope of the activity/technique are to be briefly defined. It is advisable that it is described using standard phrases developed by sectors as far as possible in order to ensure consistency between the contributing activity name and the title of the contributing scenario to be communicated in the supply chain.

A corresponding use descriptor

Each contributing activity should be linked to a standardised use descriptor category:

- **The process category (PROC)** describes the tasks, application techniques or process types defined from the occupational perspective.

- The **environmental release category (ERC)** describes the activity from the environmental (release) perspective.

- In cases of consumer uses, the **Product category (PC)** and **Article Category (AC)** also serve as a label for contributing consumers' activities.

Many of the use descriptors (PCs, PROCs, ERCs, ACs) can be used as input parameters to derive exposure estimates in modelling tools such as ECETOC-TRA. In this case, consistency with the domain of applicability of the descriptor in the context of the tool should be ensured.

R.12.4.2.5 Substance-specific information on use

This section addresses information that describes why and at which scale the substance enters in a use. These elements are grouped together as they are specific to the substance and not to the use as such. All the previous elements are common to all the substances involved in a use e.g. all the substances part of a mixtures; Registrants are to include this information in the registration dossier.

Tonnage per use

This element conveys the market tonnage of the substance relevant for this use. This information is, in particular, useful for environmental assessment. In the cases of substances of concern the information is useful for Authorities to support their decision making (e.g. on the best regulatory option for the substance or on the priority of the substance for further

regulatory actions).

The figure reported in IUCLID should be consistent with the data being used in the CSA and reported in the CSR.

Substance as such/in a mixture

Indication whether the substance that is subject to registration is supplied to the use as a substance or whether it has been incorporated into a mixture. This status is likely to change in the life cycle e.g. substance will be supplied as such to the uses in the formulation life cycle stage but it will be part of a mixture in all subsequent uses.

Technical function of the substance

This element indicates the technical function of the substance meaning what the substance actually does in the use (e.g. solvent, pigment). The corresponding use descriptor is the **technical function**.

The technical function should be clearly distinguished from the Product Category (PC). For example, a substance can be used in anti-freeze products (PC4) without being itself an anti-freezing agent. It could be a colouring agent in the anti-freeze product.

R.12.4.3. Example

An example illustrating how all these elements contribute to the description of one use is given below:

Figure R.12- 3: Example of description of use

Life cycle stage	Use name	Brief description of use process	Market description	Contributing activity name	Contributing activity descriptor	Technical function of the substance / tonnage per use / etc
Use at industrial site	Use of vehicle cleaning product	Spraying and rinsing of cleaning product at car manufacturing lines	PC35, SU17	Automated water based washing of large articles	ERC4	Technical function of substance in this use: surfactant; Tonnage per use: 100 t/y Supplied as a mixture
				Transfer of industrial detergent(charging/discharging) to a dedicated cleaning equipment (machine/vessel)	PROC8b	
				Spraying of a diluted industrial cleaning product.	PROC7	

Appendix R.12.1. Clarification of terms and concepts

Uses, identified uses and exposure scenarios

The REACH definition of **use** is given in Article 3, point 24: *use: any processing, formulation, consumption, storage, keeping, treatment, filling into containers, transfer from one container to another, mixing, production of an article or any other utilisation*.

It should be noted that according to this definition the manufacture of a substance, the distribution of chemicals (where no repacking occurs) or buying and selling are not regarded as uses under REACH. Transport as such might be considered as a use but is out of the scope of the REACH Regulation (Article 2.1(d)).

The REACH definition of "**identified use**" is given in Article 3, point 26: *identified use: means a use of a substance on its own or in a mixture, or a use of a mixture that is intended by an actor in the supply chain, including his own use, or that is made known to him in writing by an immediate downstream user*.

When CSA obligations apply, the registrant is expected to cover all the identified uses in his registration dossier and generate the related Exposure Scenarios. Uses not covered by the registrant in Exposure Scenarios demonstrating safe use should be identified as 'uses advised against' or be addressed by the Downstream user by a DU Chemical Safety report including the corresponding notification to ECHA.

There are some uses of substances which are not considered "identified uses" under REACH: the use of (the substance in) articles. This is due to the fact that the definition of identified use refers to the substance on its own or in a mixture.

Unforseable uses are not intended and are therefore also excluded from the scope of the "identified uses".

According to REACH Annex I, registrants who are required to carry out a Chemical Safety Assessment (CSA) with exposure assessment have to address all stages of the life-cycle of the substance including those resulting from the manufacture and identified uses if they happen in the EU. Therefore **exposure scenarios** (ES) should address the manufacture and such uses. The description of the identified uses should be consistent with the titles and the content of the exposure scenarios. This consistency is a legal requirement laid down in section 5.1.1 of Annex I of REACH.

In general, a 1:1 relationship between use and ES is expected. However, there are cases in which uses will not have a corresponding ES (e.g. uses covered by exemptions such as the use of a substance as a food additive in foodstuffs). There can also be cases where exposure assessments have been carried out, but they cannot easily be linked to a particular use e.g. assessment of waste stage.

It is also important to trace which use is covered in which exposure scenario, in order to (i) check whether the exposure assessment is complete and (ii) track back the Operational Conditions (OC) and Risk Management Measures (RMM) applying to a given use to verify their plausibility. This might be part of dossier/substance evaluation and impact the selection and prioritisation of substances of concern.

The use maps developed by downstream user associations are a good source of links between uses and input to the chemical safety assessments.

Uses advised against

Annex VI of REACH (information requirements referred to in Article 10) states that, where applicable, an indication of the uses which the registrants advises against and why

(i.e non-statuary recommendations by supplier) shall be provided.

In addition, Art. 37(3) REACH further specifies that where the manufacturer or importer having assessed a use in accordance with Article 14 is unable to include it as an identified use for reasons of protection of human health or the environment, he shall provide the Agency and the downstream users with the reason(s) for that decision and shall include this use as a use advised against in his registration.

A use advised against is therefore understood as a use that the registrant is aware of (either because it has been communicated by the downstream user, or because of his own knowledge). He may have considered it unsafe after carrying out the CSA, or he may have decided not to carry out an assessment and to advise against the use for reasons of precaution. In both cases the responsibility to conduct a CSA falls on the DU. Hence, the use advised against can still be carried out in the EU, provided that a DU has assessed it to be safe in a DU CSA and has done the corresponding notification to ECHA according to article 38.

Reasons why registrants may decide to advise against a use include that this use has undergone a CSA in accordance with Art.14 and no RMMs were sufficient to adequately reduce possible risks for humans or the environment, but the legal text is not limitative. Other reasons why registrants may wish to advise against uses include:

- policy decision of the registrant e.g. to dissuade any wide dispersive use of the substance (e.g. to protect his commercial interest by reducing the priority the substance may get for further regulatory actions) or to push towards other alternatives for that use;
- Conservative human health or environment protective reasons or preventive advice e.g. advising against some uses without having performed a CSA;
- technical reasons limiting the use in certain conditions;
- assessment of the use considered as not feasible or not economical.

Where a use is advised against, providing the reason why is also a requirement. It is suggested that the registrant systematically documents at least whether it results from the conclusions of a CSA duly performed in accordance with Art. 14 or from other considerations.

Note that the section on "Uses advised against" in the registration dossier does not aim at describing limitation to the uses of the substance that originates from specific Community or National provisions in relation to protection of human health or the environment (such as uses restricted under Title VIII of REACH). Such information does not have to be communicated as part of the registration dossier but shall be communicated in the supply chain as part of any SDS related to the substance as such or in a mixture (in subsection 15.1 of the SDS).

The uses advised against by a supplier are to be indicated in subsection 1.2 of the SDS. The information on the uses advised against in the registration dossier shall be consistent with the information in subsection 1.2 of the SDS.

In practice, uses advised against may be described using the same elements as the identified uses.

Appendix R.12.2. Drivers for splitting into uses and into contributing activities

Split into uses

Differentiation between uses and subsequently exposure scenarios may be driven by:

- Targeted Communication in the chain: The need to establish efficient and useful communication between suppliers and users on the safe conditions of use may drive the naming and the scope of exposure scenarios. .
- Needs to enable a consistent and transparent exposure assessment and risk characterisation for each use. This may lead to differentiation into different uses if the conditions under which the contributing activities are carried out significantly vary.
- Different regulatory implications or legal requirements e.g. uses with specific exemptions.

Uses should be described according to the life-cycle stages. Within one life-cycle stage the clustering or splitting in different uses (or ES) largely depends on the recipient of the ES. E.g. a registrant would possibly not combine lubricant products and cleaning products within one exposure scenario, as the recipients (formulating sectors) may be different.

A registrant may structure his market according to his customers in the different formulating sectors (by type of product these sectors produce) and/or end-use sectors (by sector of economy finally using the substance as such or in a mixture). If he only directly sells the substance to end-users, the formulation stage is left out.

The differentiation among uses and contributing activities, including their names should ideally be defined at sector level (names to become standard phrases in the future) and can provide more specificity than the standardised use descriptors, as explained in section R.12.4.2.2.

Each sector will decide on an appropriate granularity for their uses, based on available information on input for the exposure assessment as well as existing processes/products in the sector. The variation in the type and extent of hazard of substances entering into a use need to be taken into account.

There may be uses that are similar although carried out in different markets. In these cases registrants may decide to cover several types of chemical products (PC) or sectors of end-use (SU) or article (AC) in one use. For example the process to produce formulations can be the exactly the same regardless of whether a detergent or a paint is produced.

Identify activities contributing to a use

Different activities, processes (or process steps), tasks or unit operations can contribute to a use reported in the registration dossier.

The split into activities is largely driven by the assessment of substances for which exposure scenarios are to be generated. One contributing activity/technique will in general correspond to one set of exposure estimates and one set of RMMs/OCs i.e. one contributing scenario.

From the environmental release perspective the focus is on the type of technique(s) operated at a site.E.g. techniques leading to different emission factors and potentially requiring different types of environmental RMM will be covered in different "contributing activities". The contributing scenario relates to the conditions at a site (or an installation[10] at a site) all together leading to waste water, waste air or waste. It does not refer to single tasks or processes as defined for worker assessment. If the same use (type of site or type of installation at a site) could be carried out under various conditions in different sites (e.g. large site with extensive risk management and small sites with less effective control measures) two or more contributing techniques should be defined. It is important to clearly reflect in the name of the contributing activities/scenarios the scope and differences of their coverage.

From the human health perspective the focus is on the worker's-task or process performed, or product/article used by the individuals.

For **workers** uses, it translates into a set of tasks/processes happening at a same site (or within the same professional undertaking). When exposure assessment has been carried out, each contributing scenario corresponds to a specific activity/task/process by the workers.

Registrants need to consider whether some specific activities such as transfer, maintenance, sampling, etc. need a separate contributing activity. If they are included in a more general contributing activity it is recommended to make this clear in the contributing activity name e.g. '…including maintenance'.

In the exposure scenario, the conditions driving exposure to humans and to the environment are to be consistent. Operational conditions (OC) and risk management measures (RMM) regarding occupational exposure are usually task- or workplace-related. Releases to the environment are however mostly assessed at industrial site level or at the level of a standard municipality. Consequently one set of environmental OC and RMM related to a representative site for a use can be connected to several sets of OC/RMM for the different activities of workers carried out at this site. Even if the same activity of workers is carried out under different conditions at this site, these conditions can be still consistent with the one set of conditions related to the environment.

For **consumers** each contributing activity within one use corresponds to either a general product type (e.g. washing and cleaning products) or to a specific product type (e.g. floor cleaning product, dish washing product). These contributing activities can be grouped under the same use as long as they have the same release pattern to the environment (e.g. grouping all down-the-drain products in the same use with the different product types in different contributing activities).

[10] "Installation" is a term that plays a key role in environmental permitting system for large sites. IED permits are often given for installations rather than sites. An installation has usually an own building (with its own waste water and waste air streams) and is determined by the intention to produce something.

Appendix R.12.3. Differentiation between "industrial" and "professional[11]" life cycle stages

The REACH legal text differentiates between industrial and professional use [activity] in definition 13, 25 and 35, as well as section 6 of Annex VI. In Annex XVII also the terms "industrial installation" and activity of a "professional outside industrial installations" is used. However, no detail is given on the difference between the two and clarification is needed to support companies in this decision.

It is recommended to understand the concept "professional" as a characteristic to distinguish between use i) at industrial installations and ii) uses outside industrial installation (but not consumers or general public).

The following table provides an overview on the characteristics associated with industrial and professional uses, and can be used as support to verify whether a use should be included as industrial or professional.

Table R.12- 2: Characteristics of industrial and professional life cycle stages

	Industrial	Professional
Name in IUCLID section 3.5	Use at industrial site	Widespread use by professional workers
REACH Legal text	Industrial use (activity)	Professional use (activity)
Number of places where substance is used	Low to high	High
Number of persons potentially in contact	Low to high	High
Type of enterprises, type of business	• Production sites • Large construction sites • Large maintenance/repair and service sites	Services (mobile or stationary micro sites), administration, education, small building and construction works
Number of users/enterprises proportional to size of municipality by inhabitants	No	Yes
Activity requiring apermit according to the Industrial Emissions Directive (IED)	Often yes	Usually not
Availability of capital intensive equipment for automation and	Yes	Usually not, but can be

[11] Wide-spread use by professional workers

	Industrial	Professional
engineering controls		
Amount of processed chemicals per single enterprise/actor	Low to high	Low
Availability of staff fully dedicated to occupational Safety and Health management and for environmental management	Yes	No
Connection to public sewer	Often yes, sometimes not	Yes
For environmental assessment considered as	*Industrial use*	*Wide dispersive use* (resulting in diffuse sources of release)
Tonnage reference for local environmental standard assessment	Tonnage for one representative industrial site per use (industrial point source)	Market tonnage proportional to 10,000 inhabitants per use (municipal point source)

Examples

The following list includes typical examples for business involving chemicals which would be considered as "widespread use by professional workers":

- Building and construction business with broad variety of activities (mostly micro companies)
- Maintenance services for office/household equipment
- Indoor cleaning services for all kind of buildings
- Facade cleaning services
- Textile and fur cleaning services
- Car wash and other car care services
- Hairdressing and other beauty services
- Health care services

Typical examples for business involving chemicals which would be considered as "uses at industrial site" are:

- Production of cars and other vehicles
- Production of paper
- Textile dyeing and finishing
- Production of Semiconductors

Appendix R.12.4. List of use descriptors

Descriptor list for Life cycle stages (LCS)

The Life cycle stage description gives information on the step of the substance life where the use takes place. The life cycle starts with the first LCS Manufacture, then it generally continues with the introduction of the substance into a mixture by Formulators to conclude with different end-uses such as the use at industrial sites, or the use by professional workers or consumers. An end-use can result in the inclusion of the substance into articles, in which case the service-life stage is relevant.

The Life cycle stage descriptor is meant to indicate:

- The type of organisations concerned by the use (which implicitly provides some information on the potential for release/exposure of the substance);
- Whether the use refers to a substance in an article.

Table R.12- 3: Descriptor list for Life cycle stages (LCS)

Code	Name
LCS1	Manufacture
LCS2	Formulation and re-packing
LCS3	Use at industrial sites
LCS4	Widespread use by professional workers
LCS5	Consumer uses
LCS6	Service life

Descriptor list for Sectors of use (SU)

The categories for Sector of use are meant to provide information on the sector of the economy or market area where the use takes place. It therefore indicates types of industries or industry segments where the substance is present.

If the manufacturer/importer or the downstream user is unable to identify a suitable sector of use category from the list, the category "SU 0 - other" can be selected and the type of sector should be specified. If possible, a code (and the corresponding phrasing) from the NACE system[12] should be selected to describe such a sector.

Table R.12- 4: Descriptor list for Sectors of use (SU)

Code	Name	NACE codes
SU1	Agriculture, forestry, fishery	A
SU2a	Mining, (without offshore industries)	B
SU2b	Offshore industries	B 6
SU4	Manufacture of food products	C 10,11
SU5	Manufacture of textiles, leather, fur	C 13-15
SU6a	Manufacture of wood and wood products	C 16
SU6b	Manufacture of pulp, paper and paper products	C 17
SU7	Printing and reproduction of recorded media	C 18
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)	C 19.2+20.1
SU9	Manufacture of fine chemicals	C 20.2-20.6
SU11	Manufacture of rubber products	C 22.1
SU12	Manufacture of plastics products, including compounding and conversion	C 22.2
SU13	Manufacture of other non-metallic mineral products, e.g. plasters, cement	C 23
SU14	Manufacture of basic metals, including alloys	C 24
SU15	Manufacture of fabricated metal products, except machinery and equipment	C 25

[12] European Commission, Competition: List of NACE Codes (2007.11.19); http://ec.europa.eu/comm/competition/mergers/cases/index/nace_all.html

SU16	Manufacture of computer, electronic and optical products, electrical equipment	C 26-27
SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment	C 28-30,33
SU18	Manufacture of furniture	C 31
SU19	Building and construction work	F
SU20	Health services	Q 86
SU23	Electricity, steam, gas water supply and sewage treatment	C 35-37
SU24	Scientific research and development	C72
SU0	Other	

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2
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Descriptor list for Chemical Products Category (PC)

The Chemical Product Categories as defined in this guidance have two functions:

i) they describe the sectors formulating mixtures by mixture types (information relevant at formulation life-cycle stage). The categories listed help to further structure the uses of the substance along the supply chain based on the product types;

ii) they describe the product types used by the end-users (industrial, professionals or consumer end-users). The product type implicitly includes some information on the potential for exposure/release of the substance.

The product category does not aim at characterising the specific technical function of the substance but rather the type of mixture in which the substance is contained.

If the manufacturer/importer or the downstream user is unable to identify a suitable product category from the list, the category "PC 0 - other" can be selected and the type of product should be specified. If possible, a code (and the corresponding phrasing) from the Nordic system of Categories (UCN)[13] should be selected to describe such a product.

Table R.12- 5: Descriptor list for Chemical Products (PC)

Code	Name	Explanation and examples
PC1	Adhesives, sealants	
PC2	Adsorbents	
PC3	Air care products	
PC4	Anti-Freeze and de-icing products	
PC7	Base metals and alloys	
PC8	Biocidal products	Includes e.g. dDisinfectant products, pest control products. Note that the category refers to types of products, not to the technical function of the substance. PC 35 should be assigned to disinfectants being used as a component in a cleaning product
PC9a	Coatings and paints, thinners, paint removers	
PC9b	Fillers, putties, plasters, modelling clay	

[13] http://195.215.202.233/DotNetNuke/Portals/0/DNNPortal-Download/Funktionskoder-eng%20htm.htm

PC9c	Finger paints	
PC11	Explosives	
PC12	Fertilizers	
PC13	Fuels	
PC14	Metal surface treatment products	This covers substances permanently binding with the metal surface. It includes e.g. galvanic and electroplating products
PC15	Non-metal-surface treatment products	Like for example treatment of walls before painting.
PC16	Heat transfer fluids	
PC17	Hydraulic fluids	
PC18	Ink and toners	
PC20	Products such as pH-regulators, flocculants, precipitants, neutralization agents	This category covers processing aids used in the chemical industry
PC21	Laboratory chemicals	
PC23	Leather tanning, dye, finishing, impregnation and care products	
PC24	Lubricants, greases, release products	
PC25	Metal working fluids	
PC26	Paper and board dye, finishing and impregnation products	This category includes e.g. bleaches and other processing aids
PC27	Plant protection products	
PC28	Perfumes, fragrances	
PC29	Pharmaceuticals	
PC30	Photo-chemicals	
PC31	Polishes and wax blends	
PC32	Polymer preparations and compounds	
PC33	Semiconductors	

PC34	Textile dyes, finishing and impregnating products	This category includes e.g. bleaches and other processing aids
PC35	Washing and cleaning products	This category includes water and solvent based products
PC36	Water softeners	
PC37	Water treatment chemicals	
PC38	Welding and soldering products, flux products	
PC39	Cosmetics, personal care products	
PC40	Extraction agents	
PC41	Oil and gas field fracturing products	
PC0	Other	

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Descriptor list for Process categories (PROC)

The process categories define tasks, or process types from the occupational perspective. This descriptor can be assigned to workers activities contributing to a use. The categories are meant to support harmonised and consistent exposure assessment across sectors and supply chains.

The use descriptor included in the description of use is expected to reflect the nature and scope of the activities. The explanations and examples below should be looked at in order to ensure that the process category assigned is appropriate.

When no appropriate descriptor is available "PROC 0 - other" should be selected and a description should be provided.

Table R.12- 6: Descriptor list for Process categories (PROC)

Code	Name	Explanations and examples
PROC1	Chemical production or refinery in closed continuous process without likelihood of exposure	Describes the general nature of processes taking place in sectors where the manufacture of substances or production of mixtures takes place. The closed transfers inherent to the process including automated sampling are included. Open transfers to charge/discharge the system are not included.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure	Describes the general nature of processes taking place in sectors where the manufacture of substances or production of mixtures takes place (continuous processes that involve limited manual interventions). The closed transfers inherent to the process including automated sampling are included. Open transfers to charge/discharge the system are not included.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure	Describes the general nature of processes taking place in sectors where the manufacture of substances or production of mixtures takes place (batch processes that involve limited manual interventions). The closed transfers inherent to the process including sampling are included. Open transfers to charge/discharge are not included.
PROC4	Chemical production where opportunity for exposure arises	Describes the general nature of processes taking place in sectors where the manufacture of substances or production of mixtures takes place (processes where the nature of the design does not exclude exposure). The closed transfers inherent to the process including automated sampling are included. Open transfers to charge/discharge the system are not included.

Code	Name	Explanations and examples
PROC5	Mixing or blending in batch processes	Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use
PROC6	Calendering operations	Processing of large surfaces at elevated temperature e.g. calendering of textile or paper
PROC7	Industrial spraying	Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, blasting. Workers involved have received specific task training, follow operating procedures and act under supervision. Where engineering controls are in place, they are also operated by trained personnel and regularly maintained according to procedures.
PROC8a	Transfer of substance or mixture (charging and discharging) without containment techniques in place	Covers general transferring operations from/to vessels, containers, installations or machinery without containment techniques in place for reducing exposure. Transfer includes non-automated sampling, loading, filling, dumping, bagging and weighing.
PROC8b	Transfer of substance or mixture (charging and discharging) with containment techniques in place	Covers general transferring operations from/to vessels or containers with containment techniques in place for reducing exposure: it addresses operations where material transfers are undertaken at locations that are specifically designed and operated for the transfer of larger quantities (tens of kilos and higher) of chemicals and where the exposure is primarily related to the un-coupling/coupling activity rather than the transfer itself. Such situations include tanker loading bays and drum filling. Transfer includes loading, filling, dumping, bagging .
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage. This PROC can also be used to cover non-automated sampling operations.
PROC10	Roller application or brushing	This includes application of paints, coatings, removers adhesives or cleaning agents to surfaces. This PROC is not meant to be assigned to task such as cleaning of surfaces with wipes.
PROC11	Non industrial spraying	Air dispersive techniques Includes spraying of substances/mixtures for surface coating, adhesives, polishes/cleaners, air care products, blasting

Code	Name	Explanations and examples
PROC12	Use of blowing agents in manufacture of foam	
PROC13	Treatment of articles by dipping and pouring	Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; Includes handling of treated objects (e.g. after drying, plating).
PROC14	Tabletting, compression, extrusion, pelletisation	This covers processing of mixtures and/or substances into a defined shape for further use.
PROC15	Use as laboratory reagent	Use of substances at small scale in laboratories (< 1 l or 1 kg present at workplace). Larger operations in laboratories and R+D installations should be treated as industrial processes. This includes the use in quality control processes.
PROC16	Use of fuels	Covers specifically fuel transfers (including additives), where limited exposure to the product in its unburned form is expected. Assignment of PROC 8 not needed in this case.
PROC17	Lubrication/cooling at high energy conditions in metal forming	Lubrication and cooling at high energy conditions (temperature, friction) between moving parts and substance. Transfers for refilling or discharging from/to reservoirs are not covered.
PROC18	Greasing at high energy conditions	Greasing where significant energy or temperature is applied between the substance and the moving parts. Transfers for refilling or discharging from/to reservoirs are not covered.
PROC19	Manual activities involving hand manipulation	Addresses tasks, where intimate contact with substances may occur; no dedicated tools or specific exposure controls other than PPE. Examples are manual mixing of cement and plasters in construction works or mixing of hair dyes and bleaches.
PROC20	Use of functional fluids in small devices	Covers specifically the filling and emptying of systems containing functional fluids e.g. heat and pressure transfer fluids; takes place on routine basis Example: charging and discharging of motor and engine oils, brake fluids, home appliances. Assignment of PROC 8-9 not needed in this case.
PROC21	Low energy manipulation of substances bound in materials and/or articles	Cover activities such as manual cutting, cold rolling or assembly/disassembly of material/article)
PROC22	Manufacturing of minerals and/or metals at elevated temperature	Describes the general nature of processes taking place at smelters, furnaces, refineries, coke ovens.

Code	Name	Explanations and examples
PROC23	Open processing and transfer operations with minerals or metals at elevated temperature	Describes the general nature of processes taking place in the metal industry: Sand and die casting, tapping and casting melted solids, drossing of melted solids, hot dip galvanising, raking of melted solids in paving.
PROC24	High (mechanical) energy work-up of substances bound in /applied on materials and/or articles	Substantial thermal or kinetic energy applied to substance by e.g. hot rolling/forming, grinding, mechanical cutting, drilling or sanding, stripping.
PROC25	Other hot work operations with metals	Welding, soldering, gouging, brazing, flame cutting.
PROC26	Handling of solid inorganic substances at ambient temperature	Transfer and handling of ores, concentrates, raw metal oxides and scrap; packaging, un-packaging, mixing/blending and weighing of metal powders or other minerals.
PROC27a	Production of metal powders (hot processes)	Production of metal powders by hot metallurgical processes (atomisation, dry dispersion).
PROC27b	Production of metal powders (wet processes)	Production of metal powders by wet metallurgical processes (electrolysis, wet dispersion).
PROC28	Manual repair or maintenance of machinery	Covers activities when system is opened and potentially entered .
PROC0	Other	

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Descriptor list for Environmental Release Categories (ERC)

The ERC categories are designed to label the characteristics of a use based on different aspects relevant from the environmental perspective:

1. The life cycle stage at which a use takes place. The life cycle stage is associated with specific type of emissions/releases of the corresponding uses:
    - Manufacture and formulation can be expected to take place under conditions that minimise losses to waste or waste water and maximise transfer to the next stage
    - Differentiation on whether a use is considered
        i) taking place at (large) industrial point sources with the capacity to technically control emissions to air and waste water
        ii) Widespread and thus releases are assumed to be equally distributed across Europe, largely correlated to the number of citizens discharging into a river and no specific emission controls are in place.
    - Differentiation on whether or not a substance enters into service life

2. The technical fate (destination) of the substance resulting from the use. It indicates whether a substance is expected to become part of an article, is consumed (by reaction) on use and/or is expected to be released to soil, water air or waste. The following aspects are considered:
    - The substance (unreacted or in reacted form) becomes part of an article (including dried/cured mixtures), either because it has a function in the article or because it remains (from a preceding life cycle stage) in the article without function.
    - The substance acts as a processing aid and does not become part of an article. It is released (unreacted or in reacted form) from an industrial process (e.g. surfactant in textile finishing, solvent from spray painting) or a non industrial use (e.g. solvents or surfactants from cleaners) to waste water, air emission, soil and/or waste.
    - The substance is meant to act as part of a functional fluid (e.g. in hydraulic, heat transfer or lubrication systems). The substance is not an integral part of an article.
    - The substance reacts on use. Its reacted form (or any other transformation product) may be emitted to the environment or may become part of an article. Depending on the speed and nature of the reaction the parent substance may no longer be available for further life cycle steps or emission to the environment. However reaction/transformation products may need to be addressed in the assessment.

3. Indoor or outdoor use of a substance indicates whether direct releases to non-industrial soil or surface water may be relevant. For articles it flags in addition that increased release from article matrix may occur due to weathering conditions.

4. Indication whether articles are used under release-promoting conditions (such as abrasion from tyres or brake pads) or where the release of substances is intended (e.g. from scented articles). Also processing of articles with abrasive techniques (e.g. sanding or high pressure de-coating) is covered under this criterion.

Table R.12- 7 below provides an overview of the Environmental release categories (ERC) available for each of the life cycle stages. Table R.12- 8 provides the full description of the environmental release categories, including their name, explanation and examples. Finally, two workflows are presented that describe the decision tree for the assignment of ERCs for uses at industrial sites (Figure R.12-4) and for widespread uses (Figure R.12-5).

Please note that in the Table R.12- 7 below the ERCs are not presented in their numbering order. This is to make clearer the logic of the ERC differentiation.

Table R.12- 7: Overview of Environmental Release categories available for each LCS (ERC)

Code	Name
Manufacture	
ERC1	Manufacture of the substance
Formulation	
ERC2	Formulation; inclusion into a mixture
ERC3	Formulation; inclusion into a solid matrix
Use at industrial sites	
ERC4	Use at industrial site; No inclusion into or onto article; No reaction on use
ERC6b	Use at industrial site; No inclusion into or onto article; Reaction on use
ERC6a	Use at industrial site; reaction on use (intermediate)
ERC6c	Use at industrial site; reaction on use (monomer for polymers production)
ERC6d	Use at industrial site; reaction on use (process regulators in polymerisation processes)
ERC5	Use at industrial site; Inclusion into or onto article
ERC7	Use at industrial site; use as functional fluid
Widespread use by professional workers **&** Consumer use	
ERC8a	Widespread use; No inclusion into or onto article; No reaction on use (indoor)
ERC8d	Widespread use; No inclusion into or onto article; No reaction on use (outdoor)
ERC8b	Widespread use; No inclusion into or onto article; Reaction on use (indoor)
ERC8e	Widespread use; No inclusion into or onto article; Reaction on use (outdoor)
ERC8c	Widespread use; Inclusion into or onto article (indoor)
ERC8f	Widespread use; Inclusion into or onto article (outdoor)
ERC9a	Widespread use; use as functional fluid (indoor)
ERC9b	Widespread use; use as functional fluid (outdoor)
Service-life	

ERC10a	Use of articles; low release (outdoor)
ERC11a	Use of articles; low release (indoor)
ERC10b	Use of articles; high or intended release (outdoor)
ERC11b	Use of articles; high or intended release (indoor)
ERC12a	Industrial processing of articles with abrasive techniques; low release
ERC12b	industrial processing of articles with abrasive techniques; high release

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2 **Table R.12- 8: Descriptor list for Environmental Release Categories (ERC)**

Code	Name	Explanation and examples
ERC1	Manufacture of the substance	-
ERC2	Formulation ; inclusion into a mixture	Applies to uses in all types of formulating industries; substance is mixed (blended) into (chemical) mixtures Examples: • formulation of paints, household cleaners, lubricants, fuels, bulk chemicals for industrial uses etc.
ERC3	Formulation ; inclusion into a solid matrix	Applies to uses in formulating industries; substance is mixed (blended) in order to be physically or chemically bound into or onto a solid matrix Example: • formulation of stabilisers into master-batches for production of polymer pellets
ERC4	Use at industrial site; No inclusion into or onto article; No reaction on use	Examples: • Chemical processing where the substance is used as solvent for crystallisation • Production activities where the substance is used as a cleaning agent (solvent or surfactant) • Polymer moulding/casting where the substance is used as anti-set off agent
ERC5	Use at industrial site; Inclusion into or onto article	The substance or its transformation products are included into or onto article Examples: • Use of binding agent and process regulators in paints and coatings or adhesives • Use of dyes in textile fabrics and leather products • Use of metals in coatings applied through plating and galvanizing processes • Use of plasticisers, pigments or flame retardants in article matrix or coatings on articles Covers also uses where the substance remains in the article after having previously been used as processing aid (e.g. heat stabilisers in plastic processing)

Code	Name	Explanation and examples
ERC6a	Use at industrial site; reaction on use (intermediate)	The substance is used for the synthesis (manufacture) of other substances Examples: • Use of chemical building blocks (feedstock) in the synthesis of agrochemicals, pharmaceuticals etc. • Use of cyclopentanone in the synthesis of cyclopentanol
ERC6b	Use at industrial site; No inclusion into or onto article; reaction on use	The substance or its transformation product(s) are not included into or onto article; substance reacts on use Example: • Use of bleaching agents in textile and paper industry
ERC6c	Use at industrial site; reaction on use (monomer for polymers production)	The substance is used as monomer in the production of polymers (resins, plastics (thermoplastics)) Examples: • Use of vinyl chloride monomer in the production of PVC. • Use of monomers in production of resins
ERC6d	Use at industrial site; reaction on use (process regulators in polymerisation processes)	The substance is used as process regulator (e.g. cross-linking agents, curing agents) for polymerisation process – production of resins, thermosets, rubbers, polymers Examples: • Use of styrene in polyester production • Use of vulcanization agents in the production of rubbers
ERC7	Use at industrial site; use as functional fluid	The substance is used as functional fluid; substance is contained during the use and does not react Examples: • Use of lubricants in closed loops - e.g. engines • Use of fluids in hydraulic systems and heat transfer systems Does not cover the case where a substance/mixture is an integral part of an article (e.g. batteries) Closed system surface cleaning operations are not covered by this ERC7 but by ERC4

Code	Name	Explanation and examples
ERC8a	Widespread use; No inclusion into or onto article, No reaction on use (indoor)	Applies to uses by the public at large or by professional workers Use (usually) results in release into air or the sewage system Examples: • Down the drain product like e.g. Use of detergents in fabric washing, use of machine wash liquids and lavatory cleaners, use of automotive and bicycle care products (polishes, lubricants, de-icers) • Use of solvents in paints and adhesives • Use of fragrances and aerosol propellants in air fresheners.
ERC8b	Widespread use; No inclusion into or onto article; reaction on use (indoor)	Applies to uses by the public at large or by professional workers Example: • Use of sodium hypochlorite in lavatory cleaners, bleaching agents in fabric washing products, hydrogen peroxide in dental care products.
ERC8c	Widespread use; Inclusion into or onto article (indoor)	Applies to uses by the public at large or by professional workers; substance or its transformation products will be physically or chemically bound into or onto article Examples: • Use of binding agent or process regulators in paints and coatings or adhesives • Use of dyes during dyeing of textile fabrics
ERC8d	Widespread use; No inclusion into or onto article; No reaction on use (outdoor)	Applies to uses by the public at large or by professional workers Examples: • Use of automotive and bicycle care products (polishes, greases de-icers, detergents), use of highly volatile solvents in paints and adhesives
ERC8e	Widespread use; No inclusion onto or onto article; reaction on use (outdoor)	Applies to uses by the public at large or by professional workers Example: • use of sodium hypochlorite or hydrogen peroxide for surface cleaning (building materials)
ERC8f	Widespread use; Inclusion into or onto article (outdoor)	Applies to uses by the public at large or by professional workers; substance or its transformation products will be physically or chemically bound into or onto article Example: • Use of binding agent or process regulators in paints and coatings or adhesives during application

Code	Name	Explanation and examples
ERC9a	Widespread use; use as functional fluid (indoor)	Applies to uses by the public at large or by professional workers; substance is used as functional fluid ;substance is contained during the use and does not react Example: • Use of substance in oil-based electric heaters Does not cover the case where a substance/mixture is an integral part of an article (e.g. batteries)
ERC9b	Widespread use; use as functional fluid (outdoor)	Applies to uses by the public at large or by professional workers; substance is used as functional fluid; substance is contained during the use and does not react Examples: • Motor oils • Break fluids in automotive brake systems • Fluids/gases is air conditioning systems Does not cover the case where a substance/mixture is an integral part of an article (e.g. batteries)
ERC10a	Use of articles; low release (outdoor)	Applies to the use of articles where there is no intended release of the registered substance and where the conditions of use do not promote releases Example: • Service-life of metal, wooden and plastic construction and building materials (gutters, drains, frames, etc.)
ERC10b	Use of articles; high or intended release (outdoor)	Applies to the use of articles where the registered substance is intended to be released or where the conditions of use promote releases Examples: • Service-life of tyres and brake pads in trucks or cars
ERC11a	Use of articles; low release (indoor)	Applies to the use of articles where there is no intended release of the registered substance and where the conditions of use do not promote releases Examples: • Non-volatile substances in flooring, furniture, toys, construction materials, curtains, footwear, leather products, paper and cardboard products (magazines, books, news paper and packaging paper), electronic equipment (casing)

Code	Name	Explanation and examples
ERC11b	Use of articles; high or intended release (indoor)	Applies to the use of articles where the registered substance is intended to be released or where the conditions of use promote releases Examples: • Substances released from fabrics, textiles (clothing, floor rugs) during washing • Fragrance in scented articles (toys, papers, sanitary towels, …)
ERC12a	Industrial processing of articles with abrasive techniques ; low release	Applies to uses where the substances included into or onto articles are released (intended or not) from/with the article matrix as a result of processing by workers; release remains low. Examples: • Cutting of textile, cutting, machining or grinding of metal or polymers in engineering industries
ERC12b	Industrial processing of articles with abrasive techniques ; high release	Applies to uses where the substances included into or onto articles are released (intended or not) from/with the article matrix as a result of processing by workers; release is high. Examples: • Sanding operations or paint stripping by shot-blasting (high amounts of dust expected)

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Figure R.12- 4: Decision tree for ERC assignment for uses at industrial sites

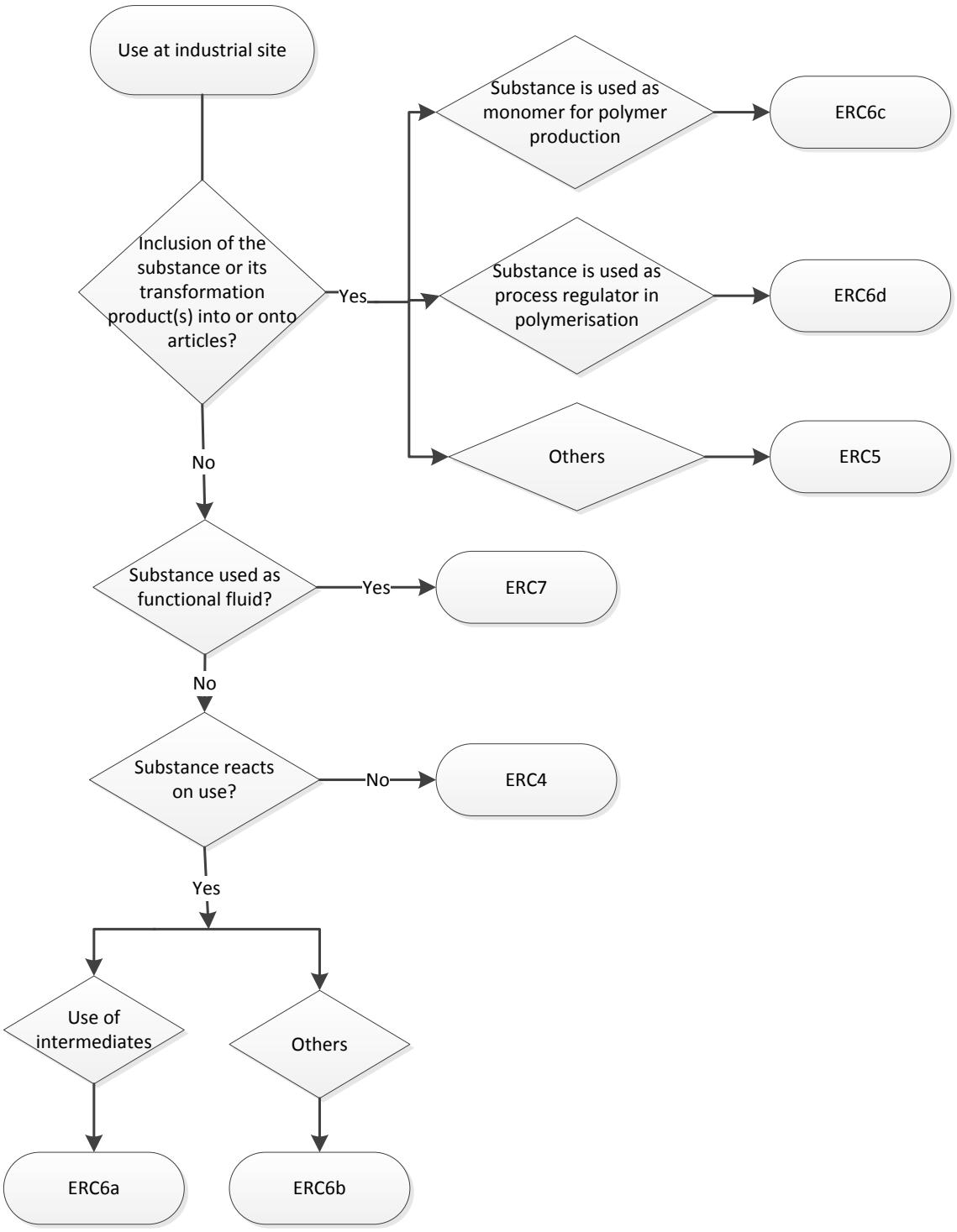
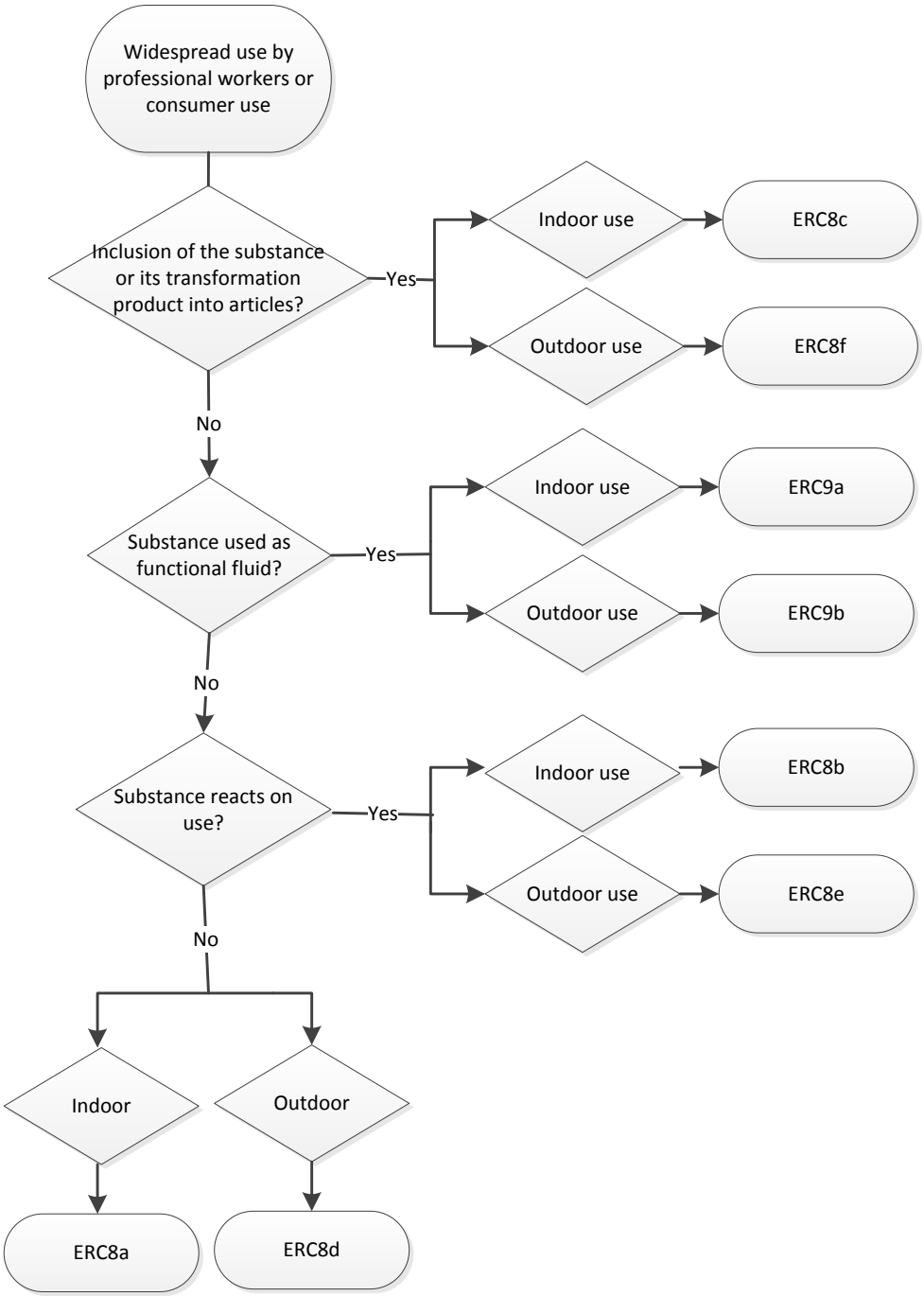


Figure R.12- 5: Decision tree for ERC assignment for widespread uses[14]



[14] Widespread uses by professional workers and Consumer uses.

Descriptor list for Article Categories (AC)

The Articles Categories (AC) are designed to describe the types of article in which the substance is contained or on which the substance has been applied. This information is relevant at the service-life stage where the activities of workers and consumers with articles need to be described.

The article categories are designed to label the characteristics of articles where the substances are applied or embedded based on different aspects, essentially:

- the type of material (matrix) e.g. plastic matrix, wood material, ceramics;
- type of articles defined essentially based on exposure consideration e.g. articles being similar in terms of release potential and most relevant exposure route. In particular the following drivers of exposure were considered: large surfaces, direct and intense skin contact, products for use by children (mouthing route to be considered), articles meant to get in contact with food. In some cases the categories also reflect specific regulatory framework applicable to the use of the article or to its waste stage e.g. vehicles, electrical/electronic articles, toys, batteries.

It should be noted that even if from the article category it appears that the main potential for exposure relates to one specific route, once it comes to the assessment, registrants are expected to assess all relevant routes. Considering a route as not relevant always requires an argumentation why the exposure is likely to be absent or negligible.

If the Manufacturer/Importer or the downstream user is unable to identify a suitable article category in Table R.12-9, or wishes to be more specific, the use could be described under "AC0 - other". If possible, a code (and the corresponding phrasing) from the TARIC system[15] should be selected.

Table R.12- 9: Descriptor list for Articles Categories (AC)

Code	Name	Suitable TARIC chapters	Explanation and examples
Categories of complex articles			
AC1	Vehicles	**86-89**	
AC1a	Vehicles covered by ELV directive		e.g. personal vehicles, delivery vans
AC1b	Other vehicles		e.g. boat, train, metro, planes
AC2	Machinery, mechanical appliances, electrical/electronic articles	**84/85**	

[15] http://ec.europa.eu/taxation_customs/dds/tarhome_en.htm

Code	Name	Suitable TARIC chapters	Explanation and examples
AC2a	Machinery, mechanical appliances, electrical/electronic articles covered by the WEEE directive		e.g. refrigerators, washing machines, vacuum cleaners, computers, telephones, drills, saws, smoke detectors, thermostats, radiators
AC2b	Other machinery, mechanical appliances, electrical/electronic articles		e.g. large-scale stationary industrial tools
	Electrical batteries and accumulators	**8506/07**	
AC3	Electrical batteries and accumulators		
Material-based categories of articles			
AC4	Stone, plaster, cement, glass and ceramic articles	**68/69/ 70**	
AC4a	Large surface area articles		Construction and building materials e.g. floor coverings, isolation articles
AC4b	Toys intended for children's use (and child dedicated articles)		
AC4c	Packaging (excluding food packaging)		
AC4d	Articles intended for food contact		e.g. dinner ware, drinking glasses, pots, pans, food storage containers
AC4e	Furniture & furnishings		
AC4f	Articles with intense direct dermal contact during normal use		e.g. jewelry
AC4g	Other articles made of stone, plaster, cement, glass or ceramic		
AC5	Fabrics, textiles and apparel	**50-63**, 94/95	
AC5a	Large surface area articles		Construction and building materials e.g. floor or wall materials: carpets, rugs, tapestries
AC5b	Toys intended for children's use (and child dedicated articles)		e.g. stuffed toys, blankets, comfort objects
AC5c	Packaging (excluding food packaging)		
AC5d	Articles intended for food contact		
AC5e	Furniture & furnishings, including furniture		e.g. sofa cover, car seat

Code	Name	Suitable TARIC chapters	Explanation and examples
	coverings		cover, fabric chair, hammock
AC5f1	Articles with intense direct dermal contact during normal use: clothing		e.g. shirts, pants, shorts
AC5f2	Articles with intense direct dermal contact during normal use: bedding and mattresses		e.g. blankets, sheets
Ac5g	Other articles made of fabrics, textiles and apparel		
AC6	Leather articles	**41-42**, 64, 94	
AC6a	Large surface area articles		Construction and building materials
AC6b	Toys intended for children's use (and child dedicated articles)		
AC6c	Packaging (excluding food packaging)		
AC6d	Articles intended for food contact		
AC6e	Furniture & furnishings, including furniture coverings		e.g. sofa, car seat, chair
AC6f	Articles with intense direct dermal contact during normal use		e.g. clothing such as jackets, shoes, or gloves
AC6g	Other leather articles		e.g. domestic articles such as decoration articles, leather boxes
AC7	Metal articles	71, **73-83**, 95	
AC7a	Large surface area articles		Construction and building materials e.g. roof sheets, pipes,
AC7b	Toys intended for children's use (and child dedicated articles)		
AC7c	Packaging (excluding food packaging)		
AC7d	Articles intended for food contact		e.g. packaging containers, metal tins, knifes, cooking pots
AC7e	Furniture & furnishings		e.g. outdoor furniture, benches, tables
AC7f	Articles with intense direct dermal contact during normal use		e.g. handles, jewelry

Code	Name	Suitable TARIC chapters	Explanation and examples
AC7g	Other metal articles		
AC8	Paper articles	**48-49**	includes paperboard, cardboard
AC8a	Large surface area articles		Construction and building materials e.g. insulation panels, wall papers
AC8b	Toys intended for children's use (and child dedicated articles)		
AC8c	Packaging (excluding food packaging)		
AC8d	Articles intended for food contact		
AC8e	Furniture & furnishings		
AC8f1	Articles with intense direct dermal contact during normal use: personal hygiene articles		e.g. nappies, feminine hygiene products, adult incontinence products, tissues, towels, toilet paper
AC8f2	Articles with intense direct dermal contact during normal use: printed articles with dermal contact in normal conditions of use		e.g. newspapers, books, magazines, printed photographs
AC8g	Other paper articles		e.g. lampshades, paper lanterns
AC10	Rubber articles	**40**, 64, 95	Includes foam materials
AC10a	Large surface area articles		Construction and building materials e.g. flooring
AC10b	Toys intended for children's use (and child dedicated articles)		e.g. baby bottle nipples, soothers
AC10c	Packaging (excluding food packaging)		
AC10d	Articles intended for food contact		
AC10e	Furniture & furnishings, including furniture coverings		
AC10f	Articles with intense direct dermal contact during normal use		e.g. gloves, boots, clothing, rubber handles, gear lever, steering wheels
AC10g	Other rubber articles		
AC11	Wood articles	**44**, 94/95	
AC11a	Large surface area articles		Construction and building materials e.g. floor,

Code	Name	Suitable TARIC chapters	Explanation and examples
			claddings
AC11b	Toys intended for children's use (and child dedicated articles)		
AC11c	Packaging (excluding food packaging)		
AC11d	Articles intended for food contact		
AC11e	Furniture & furnishings		
AC11f	Articles with intense direct dermal contact during normal use		e.g. handles, pencils
AC11g	Other wood articles		
AC13	Plastic articles	**39**, 94/95, 85/86	includes foam materials
AC13a	Large surface area articles		Construction and building materials e.g. flooring, insulation
AC13b	Toys intended for children's use (and child dedicated articles)		includes baby-bottles
AC13c	Packaging (excluding food packaging)		
AC13d	Articles intended for food contact		e.g. plastic dinner ware, food storage
AC13e	Furniture & furnishings, including furniture coverings		
AC13f	Articles with intense direct dermal contact during normal use		e.g. handles, ball pens
AC13g	Other plastic articles		
AC 0	Other		

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Descriptor list for technical functions (TF)

The Technical Function categories (TF) are designed to describe the role that the substance fulfils when it is used (what it actually does as such in a process or what it actually does in a mixture or article). The technical function is therefore focused on substances, and it is not meant to convey information on the type of mixture or article.

Specifying the technical function of the substance as such is also required for section 1.2 of the Safety Data Sheet for substances meeting the criteria for classification as hazardous. For this, the registrant may also make use of the technical functions listed in the table below.

Table R.12- 10: Descriptor list for Technical functions (TF)

Name	Explanation
Ablative	Substance that is applied to a substrate to protect it from heat by dissipating heat through the process of erosion, melting, or vaporization of the material.
Abrasive	An abrasive is a substance used to abrade, smooth, or polish an object. Abrasives are used to remove imperfections from a surface; used to smooth, scour, scrub, clean, wear down, or polish surfaces by rubbing against the surface; usually fine powders of hard substances. Examples include sandstones, pumice, quartz, silicates, aluminum oxides, and glass.
Absorbent	Chemical substance used to retain other substances by assimilation.
Adhesion promotor	Any substance, inorganic or organic, natural or synthetic, used to join opposite surfaces to each other, promote bonding between other substances, promote adhesion of surfaces, or fasten other materials together. They are generally applied from a solvent solution and allowed to dry on the two facing surfaces.
Adsorbent	Chemical substance used to retain other substances by accumulation on their surface; substance with a large surface area which can attract dissolved or finely dispersed substances from another medium.
Aerating and Dearating agents	Substance that influences the amount of air or gases entrained in a material.
Anti-Adhesive	Substance that prevents or reduces the adhesion of a material to itself or to another material; prevents bonding between other substances by discouraging surface attachment; functions as the antitheses of adhesive.
Anticaking agent	Substance that prevents granular or particulate materials from sticking or caking during transfer, storage, or use.
Anticondensation agent	Substance or material that is used to avoid condensation on surfaces and in the atmosphere.
Antifreeze agent	A substance added to fluids, especially water, to reduce the freezing point of the mixture, or applied to surfaces to melt or prevent the buildup of ice. Examples of products include antifreeze liquids, windshield deicers, aircraft de-icers, lock release agents, ice melting crystals, and rock salt.
Antioxidant	Substance that retards oxidation, rancidity, deterioration, and gum formation; used to maintain the quality, integrity, and safety of finished products by inhibiting the oxidative degradation of the ingredients in the formulation. Saturated polymers have greater oxidative stability and require relatively low

	concentrations of stabilizers.
Antiredeposition agent	Any substance that prevents dirt and grease from resettling on a cleaned surface or that helps keep soils from re-depositing onto clothing in the wash water after they have been removed. Antiredeposition agents are water-soluble and typically negatively charged.
Anti scaling agent	Substances added to products to prevent the buildup of inorganic oxide deposits. The formation of scale can be caused by the deposition of salts or minerals and may not necessarily lead to surface corrosion, therefore these chemicals are not corrosion inhibitors. Substances prevent the buildup or removes limescale and fouling. Descalers
Antistain agent	Anti-stain agent is a substance that provides stain blocking and soil resistance to soft surface cleaners and protectors.
Antistatic agent	Any substance that prevents or reduces the tendency of a material to accumulate a static charge or alters the electrical properties of materials by reducing their tendency to acquire an electrical charge.
Antistreaking agent	A substance which serves to enhance evaporation or reduce film formation in order to prevent the formulation of streaks on a surface during cleaning.
Barrier (Sealant)	Material designed only to fill up a space, prevent seepage of moisture or air, passage of liquid or gas. The spaces can be joints, gaps or cavities that occur between two substrates.
Binder	Any cementitious material that is used to hold dry powders or aggregate together; added to compounded dry powder mixtures of solids to provide adhesive qualities during and after compression to make tablets or cakes; is soft at high temperatures and hard at room temperature.
Biocide	Substance intended for preventing, neutralizing, destroying, repelling, or mitigating the effects of any pest or microorganism; that inhibits the growth, reproduction, and activity of organisms, including fungal cells; decreases the number of fungi or pests present; deters microbial growth and degradation of other ingredients in the formulation.
Bleaching agent	A bleaching agent is a material that lightens or whitens a substrate through chemical reaction. The bleaching reactions usually involve oxidative or reductive processes that degrade color systems. Bleaching and decolorization can occur by destroying one or more of the double bonds in the conjugated chain, by cleaving the conjugated chain, or by oxidation of one of the other moieties in the conjugated chain. Many have strong bactericidal properties, and are also used for sanitizing and disinfecting.
Brightener	Substance that is used to brighten, whiten, or enhance the appearance of color of fabric and paper, usually by absorbing light in the ultraviolet and violet region (340-370 nm) of the electromagnetic spectrum, and re-emitting light in the blue region (420-470 nm). This causes a "whitening" effect by increasing the overall amount of blue light reflected. Optically colorless on the substrate and do not absorb in the visible part of the spectrum.
Chain Transfer agent	Substance that terminates the growth of a molecular chain and forms a new radical that can act as the initiator for a new chain.
Chelating agent	A substance that has the ability to complex with inactivate metallic ions; used to remove ions from solutions and soils by forming a type of coordination complex so that the ions usual precipitation reactions are prevented; material that cleans oxide films from metals by stabilizing metal ions through complexing heterocyclic rings around each ion. They contain two or more

	electron donor atoms that can form coordinate bonds to a single metal atom. After the first such coordinate bond, each successive donor atom that binds creates a ring containing the metal atom; this cyclic structure is called a chelation complex or chelate.
Cleaning Agent	Substance or material used to remove dirt or impurities from surfaces; acts to loosen and remove dirt and grease from surfaces.
Cloud-point depressant	Substance that depresses the temperature at which solids begin to separate from a liquid, at a temperature lower than that normally allowed.
Coalescing agent	Ingredients that decrease the minimum film-forming temperature (MFT) and, upon evaporation, yield a hard film. In polishes, the most common coalescing agent is glycol ether however, pyrrolidines and benzoates are also used.
Compatibilizer	Enables a reaction between two or more dissimilar polymers, allowing them to become more intimately mixed than before.
Conductive agent	Material used to conduct electrical current.
Corrosion inhibitor	Chemical substance used to prevent or retard corrosionon metallic materials. They are needed in many products packaged in metal containers (such as aerosol products) and also used in such products as lubricants and other metal treatment products to provide protection to the substrates or surfaces on which the lubricants are used.
Crystal Growth modifiers (nucleating agents)	Substance used to reduce or increase crystal growth.
Deflocculant	Substance used to fluidize concentrated slurries to reduce their bulk viscosity or stickiness in processing or handling.
Defoamer	Chemical that are used to control foam; prevents foam from forming; breaks down any foam that does form; reduces foaming from proteins, gases, or nitrogenous materials. They reduce the tendency of finished products to generate foam on shaking or agitation. The ability of a material to act as an antifoam depends on its tendency to concentrate on the surface of existing or forming bubbles and to disrupt the continuous films of liquid surrounding them. As process aid, it improves filtration, dewatering, washing, and drainage of many types of suspensions, mixtures, and slurries.
Demulsifier	Substance used to destroy an emulsion or prevent its formation.
Density modifier	Substance that modifies the density of a material.
Deodorizer	Substance that reduces or eliminates unpleasant odor and protects against the formation of malodor on body surfaces. Counteraction, sometimes referred to as neutralization, occurs when two odorous substances are mixed in a given ratio and the resulting odor of the mixture is less intense than that of the separate components.
Detergent	Material that cleans by lowering surface tension, wetting, emulsifying, or dispersing grease and dirt. When incorporated into formulations, detergents give them the property of keeping insoluble material in suspension. They often refer to a combination of materials along with surfactants that act collectively to provide effective cleaning. They can be derived from natural fats and oils (like soap) or may be synthetic. Synthetic formulation will typically include hydrophilic (water soluble) and hydrophobic (oil soluble) groups. Includes surfactants, builders, chelators, and other ingredients with specific functions.
Diluent	Substance that serves primarily to reduce the concentration of the other ingredients in a formulation; volatile liquid that is added to modify the

	consistency or other properties. The term is most often used for liquid formulations, with the term filler used for solid or powder formulations.
Dispersing agent	Substance added to a suspending medium or suspension to improve the separation of particles; to ensure proper dispersion; to prevent settling or clumping; to encourage uniform and maximum separation of individual, extremely fine solid particles or liquid droplets, often of colloidal size. A typical use is dispersal of dyes to ensure uniform coloration.
Drier	These substances, which speed the drying of paint, ink, etc., are often organometallic compounds.
Durability agent	Durability are ingredients added to increase the durability and therefore the functional life of a material.
Dust Suppressant	Substance used to control finely grained solid particles to reduce their discharge into the air.
Dusting agent	Substance that is dusted on to the surface of a material (e.g., rubber) to reduce surface tack.
Dye	Substance used to impart color to other materials or mixtures; added to a material to add color; soluble. Molecularly dispersed within a liquid, transferred to a material, and bound to that material through intermolecular forces. Typically an organic substance, although exceptions do exist. A dye requires some degree of solubility that allows it diffuse into the polymeric matrix of a textile fiber.
Elasticizer	Substance that increases the elasticity of a material.
Electroplating agent	Substances/materials used as a source for a layer of metal deposited on another surface, or that aid in such a deposition.
Embalming Agent	Substance used for the preservation of biological tissue.
Energy Releasers (Explosives, motive propellant)	Substance characterized by chemical stability, but may be induced to undergo rapid chemical change without an outside source of oxygen, rapidly producing a large quantity of energy and gas accompanied by a large increase in volume and an explosion, bursting, or expansion.
Etching agent	Etching Agent is a substance that removes unprotected areas of metal or glass surfaces. Etching agents are usually acids or bases.
Explosion inhibitor	Substance used to reduce the explosion potential of flammable materials.
Fertilizers (soil amendments)	Chemical substance used to increase the productivity and quality of farm crops, including plants, animals, and forestry; added to soil to supply chemical elements needed for plant nutrition.
Filler	Ingredient added to fill out a dry product formulation and to lower the concentration of other ingredients; used to provide bulk, increase strength, increase hardness, or improve resistance to impact; used to extend a material and to reduce its cost by minimizing the amount of more expensive substances used in the production of articles; used to fill cavities or tighten joints; relatively inert and normally non-fibrous, finely divided substance added usually to extend volume and sometimes to improve desired properties, such as whiteness, consistency, lubricity, density or tensile strength.
Film former	Any component of a material that aids the material in forming a thin continuous sheet on its substrate. This sheet will act as a barrier between the

	environment and its substrate. Silicone is a good film-former in furniture polishes because of its ease of application, soil removal, and depth of glossiness. Polymers are the most commonly used film formers.
Finishing agents	Chemical substances used to impart such functions as softening, staticproofing, wrinkle resistance, and water repellence. Substances may be applied to textiles, paper, and leather.
Fire extinguishing agent	Any agent incorporated or applied to slow down combustion once started; Removes heat faster than it is released; separates the fuel and oxidizing agent; dilutes the vapor phase concentration of the fuel and oxidizing agent below what is needed for combustion.
Fixing agent (mordant)	Substance used to interact with a dye on fibers to improve fastness.
Flame retardant	Flame retardation is a process by which the normal degradation or combustion processes of polymers have been altered by the addition of certain chemicals. They are substances used on the surface of or incorporated into combustible materials to reduce or eliminate their tendency to ignite when exposed to heat or a flame for a short period of time; used to raise its ignition point; used to slow down or prevent combustion.
Flocculating agent	A flocculating agent is a chemical or substance that facilitates flocculation of suspended solids in liquid. Flocculating agents are chemical additives, which, at relatively low levels compared to the weight of the solid phase, increase the degree of flocculation of a suspension. They act on a molecular level on the surfaces of the particles to reduce repulsive forces and increase attractive forces. The principal use of flocculating agents is to aid in making solid–liquid separations.
Flotation agent	Substance used to concentrate and obtain minerals from ores.
Flow promoter	Substance that reduces drag in fluids in motion and between a fluid and a conduit surface.
Flux agent	Substance used to promote the fusing of minerals or prevent oxide formation; for casting or joining materials.
Foamant	Any substance that promotes or enhances formation of a lather or foam (i.e., a dispersion of a gas in a liquid or solid); used to form physically, by expansion of compressed gases or vaporization of liquid, or chemically, by decomposition evolving a gas, a foam or cellular structure in a plastic or rubber material.
Food flavoring and nutrient	Substance used in food or animal feedstuffs to produce or enhance taste or odour or nutritional value. Flavor compounds are molecules that stimulate the human taste chemical senses.
Fragrance	Chemical substances used to impart control odors or impart pleasing odors. Fragrance compounds are molecules that stimulate the human olfactory chemical senses.
Freeze-thaw additive	These synthetic resin emulsions or synthetic lattices enable paints, coatings, and other products to retain original consistency and to resist coagulation when exposed to freezing and thawing prior to application.
Friction agent	Materials used to enhance friction between two objects.
Fuel	Chemical substance used to create mechanical or thermal energy through chemical reactions; used to evolve energy in a controlled combustion reaction.

Fuel additive	Substances added to a fuel for the purpose of controlling the rate of reaction or limiting the production of undesirable combustion products; provide other benefits such as corrosion inhibition, lubrication, or detergency.
Gelling modifier	Substance that influences the formation or destruction of a gel.
Hardener	Increases the strength, hardness, and abrasion resistance of coatings, adhesives, sealants, elastomers, and other products
Heat stabilizer	Substance that protect polymers from the chemical degrading effects of heat or UV irradiation.
Heat transferring agent	Substance used to transmit or to remove heat from another material.
Humectant	Humectant is a substance that is used to retard moisture loss from the product during use. This function is generally performed by hygroscopic materials. The efficacy of humectants depends to a large extent on the ambient relative humidity.
Hydraulic (Functional) Fluids	Liquid or gaseous chemical substances used for transmitting pressure and EP-additives. transfer power in hydraulic machinery.
Impregnation agent	Substance used to admix with solid materials, which retain their original form.
Incandesent Agent	Substance that is used to emit electromagnetic radiation at high temperature.
Insulators	Substances used to prevent or inhibit the flow of heat, electrical current, light, and the transmission of sound between two media. (acoustic, electrical, and thermal insulators).
Intermediate (Precursor)	Chemical substances consumed in a reaction in order to manufacture other chemical substances at an industrial processing facility.
Ion exchange agent	Chemical substances, usually in the form of a solid matrix, that are used to selectively remove targeted ions from a solution. In ion exchange, ions of a given charge (either cations or anions) in a solution are adsorbed on a solid material (the ion exchanger) and are replaced by equivalent quantities of other ions of the same charge released by the solid.
Leaching agent	Substance that, when added to a solvent, aids in the dissolution of a component of an insoluble solid mixture.
Lubricanting agent	Substance introduced between two moving surfaces or adjacent solid surface to reduce the friction between them, improve efficiency, reduce wear, and reduce heat generation; enhance the lubricity of other substances. These lubricating films are designed to minimize contact between the rubbing surfaces and to shear easily so that the frictional force opposing the rubbing motion is low.
Luminescent Agent	Substance that emits visible radiation upon absorption of energy in the form of photons, charged particles, or chemical. change.
Monomers	Substance usually containing carbon and of a low molecular weight and simple structure which is capable of conversion to polymers, synthetic resins, or elastomers by repetitive combination with itself or other similar molecules.
Opacifer	Substance that renders solutions opaque; reduces transparency or the ability of light to pass through solution; added to finished products to reduce their clear or transparent appearance.
Oxidizing agent	Oxidizing agent is a substance that gains electrons during their reaction with

	a reducing agent. Oxidizing agents commonly contribute oxygen to other substances.
pH regulating agent	Maintains the desired pH range of a substance; used to alter, stabilize, or control the pH (hydrogen ion concentration) Substances used to alter or stabilize the hydrogen ion concentration (pH).
Photochemical	Chemical substance used for its ability to alter its physical or chemical structure through absorption of light, resulting in the emission of light, dissociation, discoloration, or other chemical reaction; used to create a permanent photographic image.
Pigment	Any substance, usually in the form of a dry powder, that imparts color to another substance or mixture by attaching themselves to the surface of the substrate through binding or adhesion; may contribute towards opacity, durability, and corrosion resistance. Must have positive colorant value; larger than molecular particle size and held in place by corresponding low mobility; scatter and absorb light. Pigments differ from dyes in that they are insoluble in the vehicle and exists as dispersed compounds in paint rather than as a solute.
Plasticizer	An organic compound that softens synthetic polymers; added to a high polymer to facilitate processing and to increase flexibility, plasticity, fluidity and toughness of the final product by internal modification (soluation) of the polymer molecule. Plasticizers may be added internally or externally. A rigid polymer can also be externally plasticized by addition of a plasticizer, which imparts the desired flexibility but is not chemically changed by reaction with the polymer.
Pressure transfer agent	Lubricating oil and grease additive that prevents metal to metal contact at high temperatures or under heavy loads where severe sliding conditions exist. Functions by reacting with the sliding metal surfaces to form oil-insoluble surface films.
Process regulator	Chemical substance used to change the rate of a chemical reaction, start or stop the reaction, or otherwise influence the course of the reaction. May be consumed or become part of the reaction product.
Processing aid	Chemical substances used to improve the processing characteristics or the operation of process equipment or to alter or buffer the pH of the substance or mixture, when added to a process or to a substance or mixture to be processed. Processing agents do not become a part of the reaction product and are not intended to affect the function of a substance or article created.
Propellants, non-motive (blowing agents)	Substance that is used for expelling products from pressurized containers (aerosol products); used to dissolve or suspend other substances and either to expel those substances from a container in the form of an aerosol or to impart a cellular structure to plastics, rubber, or thermo set resins; provides the force necessary to expel the contents of aerosol containers; liquefied or compressed gas within which substances are dissolved or suspended and expelled from a container upon discharge of the internal pressure through expansion of the gas. The formulated product in the pressurized container may be solution, emulsion, or suspension.
Raw material	Substance that is used as a source for the element or material.
Reactive cleaning/removal agent	Substance that reacts with and removes surface contaminants and is generally consumed, e.g., oxides, sulfide.
Reducing agent	Substance that during reactions with oxidizing agents lose electrons; commonly contributes hydrogen to other substances; used to remove oxygen,

	hydrogenate or, in general, acts as electron donor in chemical reactions.
Refrigerants	Substances used within machines such as air conditioning units, refrigerators, and walk in freezers to cool indoor air and reduce temperatures.
Resins (prepolymers)	Usually high molecular weight polymers that lower viscosity. Thermoplastic resins soften when exposed to heat and return to original form at room temperature, and thermosetting resins solidify irreversibly when heated due to cross-linking.
Semiconductor and photovoltaic agent	Substance that has resistivity between that of insulators and metals; usually changeable by light, heat or electrical or magnetic field; generates electromotive force upon the incidence of radiant energy.
Sizing agent	Substance applied to substrates such as fabric, yarn, paper products, or plaster to increase abrasive resistance, stiffness, strength, smoothness, or reduce absorption.
Softener	Substance used for softening materials to improve feel, to facilitate finishing process, or to impart flexibility or workability; used in textile finishing to impart superior "hand" to the fabric and facilitate mechanical processing; has the capability of imparting softness and pliability to washable textile fabrics.
Solids Separation (Precipitating) Agent	Chemical substances used to promote the separation of suspended solids from a liquid.
Solubility enhancer	A chemical additive that prevents chemicals or materials from separating or falling out of solution. Solubility enhancers are often used in concentrated formulations.
Solvent	Any substance that can dissolve another substance (solute) to form a uniformly dispersed mixture (solution) at the molecular or ionic size level; provides dissolving capability required for a stable formulation; dissolves certain components of the formulation to aid dispersion of components; aids oil cleansing power and controls film drying rate; allows the product to solubilize soils on surfaces and facilitate removal; used to dissolve, thin, dilute, and extract.
Stabilizing agent	A substance that tends to keep a compound, solution, or mixture from changing its form or chemical nature; renders or maintains a solution, mixture, suspension, or state resistant to chemical change; used to prevent or slow down spontaneous changes in and ageing of materials.
Surface modifier	Substance that may be added to other ingredients toadjust the optical properties associated with the surface of a material. These substances are designed to affect the luster, increase gloss, and alter the reflectance exhibited by a surface.
Surfactant	A surface active agent (surfactant) which, when added to water, causes it to penetrate more easily into, or to spread over the surface of another material by reducing the surface tension of the water (see detergent). Surface-active agents (usually referred to as surfactants) are amphipathic molecules consisting of a nonpolar hydrophobic portion, usually a straight or branched hydrocarbon or fluorocarbon chain containing 8–18 carbon atoms, which is attached to a polar or ionic portion (hydrophilic). There are 5 primary types of surfactants.
Swelling agent	Substance added to a material to cause that material to increase in volume and become softer.
Tackifier	Provides stickiness

Tanning agent	Substance used for treating hides and skins.
Terminator/Blocker	Substance that reacts with the end of a growing polymer chain, stopping further polymerization (terminator) or a substance used to protect a reactive moiety on a precursor during organic synthesis of a product that is subsequently removed regenerating the reactive moiety (blocker).
Thickener/Thickening agent	Any of a variety of hydrophilic substances used to increase the viscosity of liquid mixtures and solutions and to aid in maintaining stability by their emulsifying properties. Four classifications are recognized: 1) Starches, gums, casein, gelatin and phycocolloids; 2) semisynthetic cellulose derivatives (e.g. carboxymethyl-cellulose); 3) polyvinyl alcohol and carboxy-vinylates (synthetic); and 4) bentonite, silicates, and colloidal silica.
Tracer	Substance that possesses a readily detectable radioactive/isotopic label or chemical moiety which is added to biological/environmental media or chemical reactions to elucidate the transformation/transportation processes that are occurring.
UV stabilizer	Substance that protects the product from chemical or physical deterioration induced by ultraviolet light; absorbs UV radiation, thereby protecting varnishes and pigments against UV degradation.
Vapor pressure modifiers	Substance added to a liquid to modify its vapor pressure (e.g., to reduce evaporation).
Vehicle (carrier)	The vehicle dissolves or disperses solid components of a substance, allowing even dispersion throughout application. The vehicle carries the other particles within a substance. .
Viscosity modifier	Substance used to alter the viscosity of another substance; used to decrease or increase the viscosity of finished products; used to modify the flow characteristics of other substances, or mixtures, to which they are added; controls the deformation or flow ability of a wax product. Resins generally lower viscosity while thickeners (e.g., gums and hydroxyethyl cellulose) increase viscosity.
Waterproofing agent	A water repellent material functions by lowering the surface energy to protect surfaces against water by making water bead.
X-Ray Absorber	Substance use to block or attenuate X-rays.
Other	

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EUROPEAN CHEMICALS AGENCY
ANNANKATU 18, P.O. BOX 400,
FI-00121 HELSINKI, FINLAND
ECHA.EUROPA.EU