Cefic Guidance
Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance

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Foreword

This guidance is issued by the Cefic Exposure Scenario Task Force, which provided the project lead for the SPERC-project. The participating sector organizations retain the responsibility for the content of the SPERCs.

This is the second edition of the SPERC guidance document, developed using the version dating from July 2009 as a starting point. The feedback on SPERCs was taken into account, particularly that received through the UBA-study and via the discussion at the Cefic workshop on SPERCs, which was held in April, 2011.It also addresses the relationship between SPERCs and CHESAR, the chemical safety assessment and reporting tool developed by ECHA. All SPERCs which have been made available through the Cefic SPERC project will be made available to CHESAR users as so-called CHESAR SPERC files.

This document serves several purposes. It outlines the concepts behind the SPERCs and presents the terminology used in conjunction with the SPERCs (Section 1). In Section 2 the concept of emission assessment under REACH is addressed in order to provide the necessary background information. Section 3 explains the SPERC factsheet, in which the full set of SPERC information is documented. It also outlines the relation of SPERCs with CHESAR.

Section 4 outlines how registrants (and the consultants working for them) can find and make use of SPERC information. The downstream user perspective is addressed in section 5 with emphasis on how downstream users check whether they are covered by a SPERC. Section 6 addresses sector groups and trade associations and provides information on how to develop SPERCs. The appendices contain detailed information and examples.

SPERCs have been developed in response to novel challenges arising from REACH chemical safety assessments. These require that exposure scenarios be developed for the uses of dangerous substances which are produced in excess of 10 tons per year. REACH exposure scenarios are a new concept for establishing and communicating conditions of safe use of substances in the supply chain. This is a particular challenge for the environmental aspects. Here, the conditions of safe use encompass amounts handled in an operation, fractions of substance amounts lost from the process to air, water and soil and the efficiency of risk management measures. In the past, such information was not subject to routine risk assessments. However, REACH requires considering these factors in the Chemical Safety Assessment, and the development of REACH exposure scenarios which define conditions under which control of risks is warranted.

SPERCs address the above challenges, originating from the need to have standardized emission estimates, and were developed with the following in mind:

1) The quantitative nature of standardized environmental assessments needs to be carried through the supply chain. This facilitates adapting conditions of use, which are defined at a generic level, to the conditions prevailing at specific sites.
2) The conditions of use are developed with the actual use conditions in mind. To that end, this document provides guidance on how to describe these conditions in terms which feed into risk assessments.
3) Redundant communication in the supply chain is to be avoided. To that end, this document attempts to foster standardization of assessments and their communication.

1. General Relevance - Registrants & Downstream Users

1.1 SPERCs are built on the basis of the REACH Guidance

Chapter R16 of the REACH Guidance on Information Requirements & Chemical Safety Assessment (IR&CSA guidance) introduces Environmental Release Categories as generic, broadly applicable emission scenarios. They define the fractions of a substance emitted during a process/application, and provide default assumptions for the local environmental properties. An industry evaluation concluded that ERCs provide for standardization while leading to unrealistically conservative emission estimates.

The IR&CSA guidance acknowledges that an "ERC should be used as a starting point for emission estimation" and explicitly encourages the use of more refined or specific information for emissions. This document provides guidance on the development, and use of specific ERCs (SPERCs). It defines SPERCs, and describes how they are developed and how they can be accessed by registrants and downstream users. It provides guidance for registrants to use SPERCs in performing environmental safety assessments, and to communicate the results to the downstream users. In addition it addresses how downstream users check whether their own uses are covered by a SPERC-based Exposure Scenario.

1.2 What are SPERCs and their limitations

These are the key aspects regarding SPERCs:

- SPERCs are an element of standardized supply chain communication of environmental assessments, e.g. in GES
- SPERCs are developed by industry sector groups, and trade associations
- SPERCs usually refine the ERC-based emission estimation
- SPERCs describe typical operational conditions that are relevant with regard to the emissions of substances to the environment
- SPERCs define realistic default values of the fractions which are released to water, air, soil and, where appropriate, waste
- SPERCs define risk management measures that are typically employed to reduce emissions
- SPERCs are documented in SPERC factsheets, deposited in ES library
- SPERCs are / will be available in exposure assessment tools such as in CHESAR (ECHA's Chemical Safety Assessment tool), ECETOC TRA, Petrorisk, and EasyTRA

The comparison of SPERCs with ERCs is shown in Table 1.1.

Table 1.1: Comparison of SPERCs and ERC.

	ERC	**Specific ERC (SPERC)**
Emission estimate	Standardized	Standardized
Defaults	Worst case	Good practice
RMMs	Not included	Considered
Responsible	ECHA	Trade associations, sector groups of registrants, end users, or formulators

While SPERCs provide refined emission estimates in comparison with ERCs, the SPERCs employ conservative values of release factors: In cases where the use of SPERCs does not yield successful exposure estimates, the emission assessment may need to be refined (see section 4.5).

1.3 Overview of SPERCs available

SPERC factsheets have so far been developed by a variety of trade groups and sector organizations. These organizations are the owners of the SPERCs and retain the responsibility for SPERC content. Table 1.2 provides an overview of the trade groups that have made SPERCs available and the uses addressed by their respective SPERCs, and the web-addresses at which the SPERC factsheet can be accessed. As of fall 2012, so-called CHESAR SPERC files will also be available at these web-sites. Such files can be uploaded into CHESAR by anyone who wants to perform environmental exposure assessments with CHESAR, the chemical safety assessment and reporting tool developed by ECHA. CHESAR SPERC files facilitate the assessment and reporting of the assessment outcome in CHESAR.

1.4 Naming SPERCs

SPERCs will be identified with an unequivocal and systematic name in order to facilitate searching. For instance the SPERC for formulation of detergents and maintenance products is abbreviated as A.I.S.E. 2.1.v1. In this code, the first part (A.I.S.E.) specifies the entity (i.e. A.I.S.E., the European Association for cleaning and maintenance products), which is responsible for the contents of the SPERC. The first number (i.e. 2) specifies the ERC, which is refined by the SPERC. The third part (‘1’) is an index number given by the entity, which is responsible for the contents of the SPERC. One SPERC may contain several sets of default values. These will be indicated by lower case letters, as can be seen in the example SPERC for formulation of detergents and maintenance products. Part four (‘v1’) is the version number.

Table 1.2: Overview of SPERC development activities.

Developer	Acronym[1]	Uses addressed	Factsheet available at
European Automobile Manufacturers' Association	ACEA	Industrial use of coatings in the automotive industry	http://www.cepe.org/EPUB/easnet.dll/ExecReg/Page?eas:template_im=100087&eas:dat_im=101AED#SPERCs
Global federation of national trade organisations in the area of vehicle repairs.	AIRC	Small scale industrial use of coatings in car repair body shops	http://www.cepe.org/EPUB/easnet.dll/ExecReg/Page?eas:template_im=100087&eas:dat_im=101AED#SPERCs
International Association for Soaps, Detergents and Maintenance Products	AISE	Formulation of and industrial and wide dispersive use of laundry, cleaning, and maintenance products	http://www.aise.eu/reach/?page=exposureass_sub4
European Sector Group of the producers and users of paints, printing inks, industrial coatings and artists' colors	CEPE	Formulation of coatings and inks, industrial applications	http://www.cepe.org/EPUB/easnet.dll/ExecReg/Page?eas:template_im=100087&eas:dat_im=101AED#SPERCs
European trade association of the cosmetics industry	Cosmetics Europe	Formulation of and wide dispersive use of personal care products.	http://www.cosmeticseurope.eu/safety-and-science-cosmetics-europe/reach-and-chemicals/use-and-exposure-information.html
Europeam trade organization of producers of pre-coated metal.	ECCA	Industrial use of coatings in strip coating of metals (coil coating)	http://www.cepe.org/EPUB/easnet.dll/ExecReg/Page?eas:template_im=100087&eas:dat_im=101AED#SPERCs
European Crop Protection Association	ECPA	Wide dispersive use of non-active ingredients of plant protection products	http://www.ecpa.eu/information-page/regulatory-affairs/reach
European Federation for Construction Chemicals	EFCC	Formulation of and industrial and wide dispersive uses of construction chemical products	http://info.vci.de/user_cc/SPERCs/Forms/AllItems.aspx
European Metal Packaging (EMPAC)	EMPAC	Industrial uses of paints and coatings in metal packaging	http://www.cepe.org/EPUB/easnet.dll/ExecReg/Page?eas:template_im=100087&eas:dat_im=101AED#SPERCs
European Solvents Industry Group / Downstream users of solvents	ESIG/ESVOC	All uses of solvents.	http://www.esig.org/en/regulatory-information/reach/ges-library/ges-SPERCs-2/

[1]For explanation of abbreviations, please see the following sections

European Tyre & Rubber Manufacturers' Association	ETRMA	Manufacture of rubber products.	http://www.etrma.org/activities/chemicals/reach/emission-factors
EU federation of adhesive and sealant manufacturers	FEICA	Formulation of and industrial and wide dispersive uses of adhesives and sealants	http://www.feica.com/ehs-sustainability/reach/feica-use-descriptors
European Association of Metals	Euro-metaux	Manufacturing, formulation and industrial uses of metal and metal compounds	http://www.arche-consulting.be/metal-csa-toolbox/SPERCs-tool-for-metals/
Federation of the textile chemical industry and German textile industry federation	TEGEWA	Industrial applications of textile treatment chemicals	http:// www.textil-bekleidung.de, and at http://www.tegewa.de

2. The SPERC emission assessment concepts

The emission assessment is one step in the process of the environmental exposure assessment. It defines the amounts emitted into the environment per unit of time. The point of departure of the emission assessment is the amount of chemical which goes to a certain use. In the emission assessment, a local and a regional amount used are defined as use rates (see 2.3). The use rates multiplied with release factors yield amounts emitted to the environmental compartments air, water and soil. The SPERCs support the estimation of the use rates and they define release factors. The relationships between these numerical parameters and the operational conditions, and, if appropriate, risk management measures are detailed in the SPERC factsheets.

2.1 Distinguishing industrial and wide dispersive uses

From emission assessment perspective, wide dispersive uses are due to uses by consumers or professionals. These uses result in more or less evenly distributed substance emissions over time and in the geographical region under assessment. In addition, there are typically no technical measures by which consumers and professionals can control emissions.

Industrial uses in contrast assume the use of substances at an industrial site which is a point source. This site operates certain applications and processes. Two important characteristics of industrial uses are that the operator is obliged to have an emission permit and that he has access to technical emission control. This interpretation means that small scale uses such as car-wash installations, car-repair body shops, etc are considered industrial uses. Table 2.1 presents an overview of how industrial and wide dispersive uses from an emission assessment point of view align with consumer, professional and industrial uses from a human health assessment view.

Table 2.1: Sorting SPERC types vs Main User Groups and the underlying criteria.

Main User Group	Emission permit and / or access to general technical emission control	Obligation to take SDS recommendation into account	SPERC Type
Industrial Use	Yes	Yes	Industrial Use
Professional Use*	No**	Yes	Wide dispersive Use
Consumer Use*	No	No	

* Professional and consumer users are in charge of release control by following instructions for equipment cleaning and disposal.

** Specific measures may be encountered in some professional uses.

2.2 SPERCs and terminology related to amounts used:

When performing Environmental Safety Assessments as part of the REACH Chemical Safety Assessments, different types of amounts need to be distinguished. First, there is the mass of substance registered for a use in the EU, Q_{Use} (in tons/year). A fraction thereof is defined to be used in one region. The corresponding amount is referred to as amount used regionally $Q_{Use,Region}$ (in tons/year). At the local level the local amount used is referred to as M_{Local}. (kg/d). For industrial uses, a part of the SPERCs define values of M_{Local}. These values are referred to as M_{SPERC}. A fifth term, M_{Safe}, refers to the value of M_{Local}at which PEC=PNEC(i.e. RCR =1). M_{Safe} is the outcome of the environmental exposure assessment and derived for the compartment with the maximum value of RCR.

2.3 Defining the local use rate: ERC vs SPERC

The local amount used (M_{Local}) is one of the key parameters for the emission estimation. In the ERC based emission assessments, this parameter is estimated according the EU TGDusing fixed default values. In contrast, in SPERCs for wide dispersive uses the value of

$F_{Mainsource}$, can be defined. For industrial use, the local amount used is estimated independently of the TGD-default values. Table 2.2outlines these differences. It is partly reproduced from the ECETOC Technical Report 114

Table 2.2: Overview of the parameters used in the REACH emission estimation and how they are used in Tier 1, SPERC-based, and higher tier assessments

Parameter	**Abbreviation**	**Unit**	**ERC based emission assessment – ECHA Guidance**	**SPERC based emission assessment**
Mass of substance registered for a use in the EU	Q_{Use}	t / a	Defined by Registrant – use market intelligence	Defined by Registrant – use market intelligence
Fraction of Q_{Use} which is used in one region	F_{Region}	Unitless	Default values: 0.1 and 1.	Default values (0.1, 1) used in standard mode, free choice of value in advanced mode.
Regional amount used	$Q_{Use,Region}$	t / a	$Q_{Use,Region} = Q_{Use} \times F_{Region}$	$Q_{Use,Region} = Q_{Use} \times F_{Region}$
For industrial uses: Fraction of amount used in a region ($Q_{Use,Region}$) which is used in one point source	$F_{Mainsource}$ Industrial use	Unitless	1	Not used in derivation of M_{Local}
For wide dispersive uses: Fraction of $Q_{Use,Region}$, which is used in the unit town of 10.000 Inhab	$F_{Mainsource}$ dispersive uses	Unitless	0.002	See SPERC factsheets*
Number of days per year during which emissions occur	$T_{Emission}$	d / a	Default values: 10, 20, 100 or 300 days according to guidance	Defined in SPERC factsheets, not relevant for emission estimation.
Industrial use Local amount used	M_{Local}	Kg/d	$M_{Local} = Q_{Use, Region} \times 1000 \times F_{Mainsource} / T_{Emission}$	M_{SPERC} realistic worst case estimate of M_{Local}must be overwritten by registrant if $M_{Local}$is known to be higher than M_{SPERC}; may be overwritten in other cases.
Wide dispersive uses Local amount used	M_{Local}	Kg/d	$M_{Local,Dispersive} = Q_{Use,Region} \times 1000 \times F_{Mainsource} / T_{Emission}$	

2.4 Release Factors

The release factors ($F_{Release}$) are specified as numeric values for all three emission routes (air, water, and soil). The values of .$F_{Release}$ express the fractions of M_{Local}, which are emitted to the environment via water, air, or soil. For most SPERCs, the initial release factors define the primary emissions from a process, i.e. these release factors do not account for the mitigating effect of risk management measures.

The sector association have used a variety of approaches and starting points to derive values of $F_{Release}$.These include for instance BREF documents, OECD emission scenario documents, measured emission data, sector knowledge and expert judgment .Appendix 5 gives an overview of the approaches followed by several sectors. Where appropriate, release factors have been defined to be dependent on substance properties. In those instances, release factors are assigned to ranges of vapor pressure and/or volatility. As a consequence, a SPERC factsheet may specify a whole suite of release factors.

2.5 RMM Efficiencies in Emission Estimation

For most SPERCs, the initial release factors ($F_{Release}$) define the primary emissions from a process. The risk management measures are explicitly addressed by accounting for their efficiency ($RE_{Total,\ RMM\text{-}Water}$). This efficiency defines the degree by which the emissions are reduced. The release factor for the primary emission and efficiency of the risk management measure are combined according to Equation 2.1 to obtain the resulting overall emission factor $F_{Overall}$.

$$F_{Overall,\ water} = F_{Release,Water} \times RE_{Total,\ RMM\text{-}Water} \qquad \text{Equation 2.1}$$

For a number of SPERCs (e.g. those of Eurometaux) the effect of the risk management measures is already accounted for in the initial release factors. For such SPERCs, $F_{Overall}$equals $F_{Release}$ and is not deduced according to Equation 2.1.

2.6 The Municipal Sewage Treatment Plant and SPERCs

For many substances, the process occurring in the municipal sewage treatment plant provide for efficient removal from the wastewater. Nonetheless, the municipal sewage treatment plants are not considered to be a risk management measure in the framework of SPERCs, since they are not under the control of the downstream user.

3. Information in a SPERC Factsheet

The set of information, which constitutes a SPERC definition is documented in a SPERC factsheet. A SPERC factsheet according to the Cefic agreed format has 12 sections and an Appendix. Table 3.1.provides an overview of the SPERC factsheet format.

3.1 Identifying and retrieving SPERCs

The first four sections (Title of SPERC, SPERC code, Scope, Related use descriptors) provide information which is to support the user of a SPERC in deciding whether a SPERC is relevant to him or in helping him retrieving SPERCs in databases, e.g. in a libraries of SPERCs. This can be done on the basis of the title of the SPERC, the SPERC code, the description of the scope, or the related use descriptors.

3.2 Release factors

This section specifies the release factors and a justification for the release factors. The justification explains on which basis the release factors were derived. It may provide references to literature or methods or direct links to related documents. Where appropriate, the fraction of substance, which is diverted through an RMM from an emission pathway to waste is indicated by a release factor.

Table 3.1: Overview of the SPERC factsheet format.

Section	Content of Section
Title of SPERC	short title of SPERC
SPERC code	Structured Code of SPERCs (e.g. A.I.S.E. 8a.1a.v1)
Scope	Limitations of coverage compared to ERC relating to: • User groups (if not already obvious from Title) • Substance groups or functions (e.g. solvents, additives) • Types of products (e.g. coatings, water borne mixtures) • Processing conditions (e.g. dry processing, no high temperatures) Explicitly specifies conditions or processes which are not covered
Related use descriptors	SU, PCs, PROCs or ACs if relevant
Operational conditions	Clear description of the operational conditions that determine the emission. Specification of concepts such as efficient resource use by quantified indicators (e.g. % of raw materials use) or qualitative conditions (e.g. processing techniques)
Obligatory onsite RMMs	Clear description of risk management measures that are to be applied and the existence of which is assumed in the (initial) release factors. no RMMs needed to be explicitly stated, if release factors apply without any RMM
Substance use rate	Value of the substance use rate (in tons/day), if defined for the SPERC. Can be replaced in the assessment.
Days emitting	Value of the number of emission days. Without influence on the emission estimation, can be useful for deriving annual substance use rate.
Release factor (air, soil, water, soil, waste)	Numeric value Justification of value by reference to literature or methods. Direct link to related documents.
Optional risk management measures for iteration	Specifies RMMs that are not considered in the release factor or the obligatory RMM. Optional RMMs are intended to provide guidance to - registrants for iterating his assessment. - downstream users to find alternative RMMs (if the obligatory RMMs are inappropriate for his specific situation) - downstream users to find RMMs which can be used when a SPERC w/o RMM is insufficient to cover the use at his site. If possible and available, risk management measures should be named and efficiencies in relation to substance groups should be provided.
Narrative description	Short and concise flow text description. Relevant items to be specified: Abstract description of full process (e.g. storage, automated pumping of substances to mixing vessels, continuous or batch wise processing, automated packaging, cleaning of equipment, local exhaust ventilation) Explicit mentioning of whether or not cleaning of equipment and side activities are covered. Unambiguous description of conditions regarding waste management and wastewater discharges (e.g. if there are no restrictions in scope, statement that any type of waste disposal is covered). No justification should be included.
Scaling	Reference to the Cefic guidance on how to communicate scaling rules to DU. Only Scaling information that is specific to the sector / SPERC should be provided
Appendix	The determinants for use in the CSR and to be used in CHESAR need to be specified in the tabular format outlined in Appendix 2.

3.3 Use conditions determining the releases

The sections ‘Operational conditions’, ‘Obligatory onsite RMMs’, and ‘Narrative description’ provide the description of the conditions of use which are related to the release factors. The narrative in aSPERC factsheet is intended to be used for identifying the process step(s) which is (are) critical for the emissions to the environment and for rationalizing what fraction of a substance is lost from a process to water, air, and soil. In that manner the narrative explanation of typical sector operational conditions provides justification for the selection of the initial release factors.

Following the suggestions from the SPERC workshop, the existing ambiguities regarding whether Risk Management Measures (RMMs) are already accounted for in release factors or whether RMMs act to reduce the release factor have been eliminated.

As part of current practice, emissions are controlled by RMMs, if so required. SPERCs reflect this by including RMMs, where these are applicable for the operations. RMMs impact on the exposure assessment by reducing the emission. To that end, RMMs can be assigned a numerical value for their substance removal efficiency in the release streams, particularly, of air and wastewater. Such efficiency values have been defined in the BAT- BREF-documents. They are available via the Cefic library of RMMs and are abbreviated as RE_{RMM}. (see Appendix). If more refined information is available, it can of course be used in developing a SPERC. Appendix 4 shows the default efficiencies of RMMs included in the Cefic library of RMMs. It is important to note that RMM efficiencies often depend on substance properties and process characteristics. Hence, default efficiencies are indicative, however may not reflect technically achievable efficiencies (i.e., actual efficiencies may be less than or greater than the default value). Consequently, the risk assessor is responsible in deciding whether the assumptions made regarding RMM efficiencies are appropriate/relevant for the process/use and the substances being evaluated.

In the Appendix of the SPERC factsheet, the essence of this information is summarized in the form of CHESAR determinants. According to the CHESAR model terminology, operational conditions and risk management measures are referred to as determinants. CHESAR includes a library in which systematically defined determinant types can be stored, in order to facilitate the re-use of determinants across assessments. Further explanation is given in Appendix 2.

3.4 Substance use rates / Amounts used

The section ‘Substance use rate’ can be used to specify values of M_{SPERC}, i.e. indicative values of M_{Local} for the SPERC. The value of M_{SPERC} is intended to provide orientation to registrants that do not have much information about typical substance uses rates in downstream applications.

3.5 Sections addressing the downstream user

The ‘Days emitting’ provides the number of days during which a process is operated. This information should support downstream users in identifying the SPERC applicable to their process. In addition to the required risk management measures, the section on ‘Alternative Risk management measures’ can be used to suggest risk management measures that can be used to replace the obligatory risk management measures. The information can also be used by downstream users to adapt risk management measures in case a SPERC-based equivalent exposure scenario does not cover the downstream user’s operation. The section on scaling information may be used to define information in relation to adapting the generic SPERC-based exposure scenario to the specific downstream user operation. The downstream user issues are discussed in further detail in Section 5.

3.6 SPERC factsheet content in CHESAR

The trade associations which have developed SPERCs have decided to make SPERCs available for registrants using CHESAR. This requires that the information from the SPERC factsheets is made available in files that can be imported into CHESAR. These files are named CHESAR SPERC files. Herein, information from the SPERC factsheets is organized according to the data structure underlying CHESAR. Further details on the CHESAR data structure are detailed in the documentation on CHESAR.

In the CHESAR model, the operational conditions and the risk management measures are jointly addressed under the term determinants. CHESAR contains two libraries: one for determinant types and one for SPERCS. Appendix 2 displays the list of determinants as they have been defined for the SPERCs available so far.

4. Registrants using SPERCs

4.1 Where to find SPERC information

Information on SPERCs is available from different sources. More detail is provided in the SPERC overview (http://www.cefic.org/Industry-support/Implementing-reach/Libraries/).

Most sector groups that have developed SPERCs provided so called use mappings on their homepages. Where not included yet, these mappings will be amended with the information on which SPERCs are relevant for which uses. In that manner, the use mappings will support the selection of the appropriate SPERCs.

4.2 SPERCs and assessment tools: EUSES, TRA, CHESAR

Chapter R16 of the REACH Guidance on Information Requirements & Chemical Safety Assessment (IR&CSA guidance) mentions several tools for supporting environmental exposure assessments. These include ECHA's chemicals safety assessment tool CHESAR, EUSES, and the TGD Excel Sheet. PETRORISK and ECETOC TRA ENV are additional tools which are based on the TGD Excel Sheet and which offer complementary functionalities. All these tools implement the exposure assessment rules as laid down in Chapter R16 of the IR&CSA guidance.

SPERC-based emission estimates can be employed/used as input values in each of these tools. PETRORISK and ECETOC TRA ENV have implemented functionalities which support the automated use of SPERCs. Table 4.1 specifies how to perform SPERC-based emission assessments in conjunction with these tools. SPERCs are progressively developed and revised, but assessment models are not revised concomitantly. It is thus the assessor's responsibility to check that the SPERCs proposed by the model are up-to-date.

Table 4.1.Overview of environmental exposure assessment tools and how they relate to SPERC-based emission estimation.

Tool	**Use of SPERC-based emission estimation**
CHESAR	- SPERCs will become available as CHESAR SPERC files to be used in CHESAR exposure assessments
EUSES	- SPERCs not implemented - SPERC-based emission estimates are derived off-line - Manual entry of emission estimates
TGD Excel Sheet.	
ECETOC TRA ENV	- SPERCs implemented with selection via pick-list - SPERC-based emission automatically feeds into exposure estimation
PETRORISK	
EasyTRA	

The responsibility for issuing new or revised SPERCs lies with the associations. It is their task to inform tool owners about new and revised SPERCs. If such new information is published but not implemented in a tool, the assessor can use it for example by manually entering relevant SPERC release fractions in the model.

4.3 SPERC-based environmental assessments in the CSR

The registrant submits his assessment to ECHA in a CSR. The CSR should provide a comprehensive set of information required to understand the assessment and to check it for plausibility. For SPERC-based assessments it is recommended to provide the essential information on operational conditions and risk management measures in the CSR. This can be accomplished by inserting the so-called determinants into the CSR. The determinants are listed in the Appendix of the SPERC factsheets. In that manner, dossier evaluators are provided with information on OCs and RMMs, which allows them to judge whether the SPERC based environmental assessment fits with the overall Exposure Scenario.

In addition, the SPERC used for the emission estimation and the information needed to perform the quantitative environmental assessment should be reported in the CSR. This includes the substance use rates for the region ($Q_{Use,Region}$),the local amount used (M_{Local}) and the release factors. Finally, the CSR specifies the outcome of the assessment by detailing for instance the PECs, the RCRs, or the value of M_{Safe}.

4.4 SPERC-based environmental assessments in the safety data sheet

As outlined above, the Exposure Scenarios in the CSR contain an extensive amount of information. Much of the information reported in the exposure assessment is difficult to understand by the non-expert user, thus only parts of it are relevant for the downstream user. The downstream user checks whether his application is addressed in the risk assessment. For that reason, the information to be communicated to downstream uses should be reduced to those information items which are essential. From this perspective, the level of information communicated for wide dispersive uses versus industrial uses need to be distinguished according to the guidance provided in section 2.1.

Wide dispersive uses. As outlined in section 2.1, consumers and professional users have limited capability of controlling emissions. For that reason, there is no added value in communicating explicit information with respect to SPERCs beyond the minimum requirements. The producers of end-use products only need to be informed whether the use of the substance in their professional and/or consumer application is safe.

The producer of end use products has to translate the operational conditions specified in the respective SPERC factsheet into instructions. They can be communicated in the safety data sheet to professional users and on the packaging to consumers. For solvent-borne paint such instructions could read ‘Wash brushes with XYZ solvent. Do not dispose paint and washing with wastewater. Allow solvent to evaporate prior to disposal with solid waste.’

Industrial uses. In contrast to professional users and consumers, industrial end users can control their emissions and align the conditions of use at their site. The information provided to them in the safety data sheet therefore may include the following

- the identity of the SPERC
- the operational conditions (coded in phrases)
- the risk management measures (coded in phrases) and its assumed efficiency.
- an indication whether scaling is appropriate

if scaling is appropriate: the dilution factor assumed in the assessment, and the value of M_{Safe} (alternative to M_{Safe}, the value of M_{Local} is assumed in the assessment, the values of RCR, and the maximum value of RCR to which the assessment may be adjusted. This value represents the limit set by the registrants and must be respected by the downstream user.)

4.5 How to refine SPERC-based assessments (registrants)

SPERCs are part of a generic approach to derive environmental exposures. Hence, SPERC-based environmental exposure assessments are still lower tier assessment. That means that assessments employing SPERC-based emission estimates may indicate a possible risk. In such cases refinement may be needed. Figure 2 shows that beyond ERC- and SPERC-based assessments there are higher tier environmental exposure estimation options as well as the option to base the assessment on measured environmental concentrations/ monitoring data. For more detailed information on refining environmental exposure assessment, please refer to Appendix H of ECETOC Technical Report 107 and to ECETOC Technical Report 114.

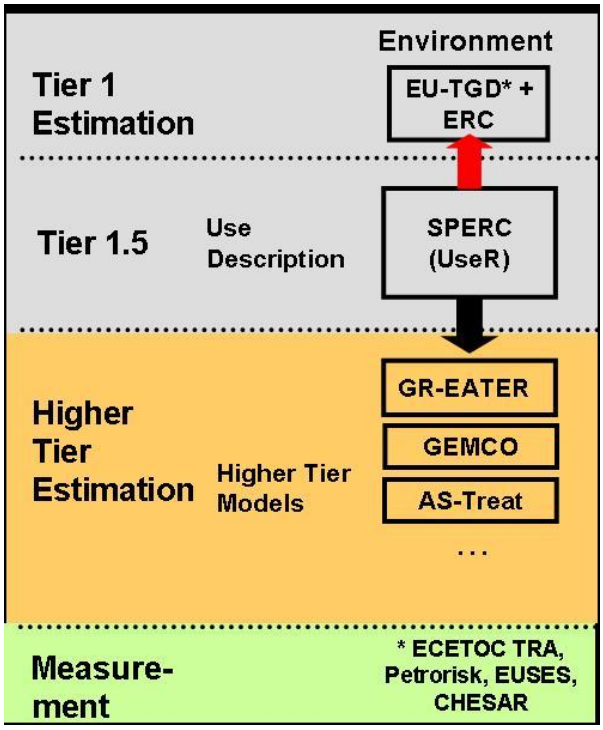

Figure 4.1: Tiered environmental exposure assessment.

4.6 Accounting for additional Risk Management Measures

In the course of iterating the Exposure Scenarios, the assessor determines which RMM efficiency or removal efficiency is required for demonstrating safe use. In many cases, the required removal efficiency may be met by the RMMs and associated efficiencies (individually or in combination) defined in the SPERC factsheet. If the combined effect of multiple RMMs can be assumed linear (i.e., RMMs in combination are equally as effective as when implemented alone), overall or total removal efficiencies should be calculated according to Equation 4.1. The resulting value of $RE_{Total,RMM}$ can then be used to recalculate the overall release fraction according to Equation 2.1.

$$RE_{Total,RMM} = 1 - (1 - RE_{RMM,1}) \times (1 - RE_{RMM,2}) \times (1 - RE_{RMM,n}) \qquad \text{Equation 4.1}$$

Ultimately, the assessor must conclude whether or not the SPERC-based emission assessment was successful, i.e. safe use was demonstrated, within the appropriate boundaries of typical substance and process/use conditions, and that reasonable RMM removal efficiencies have been assumed. When this is not the case, the assessment may need to be refined beyond the boundaries set by the SPERC-based emission assessment.

5 SPERCs and Checking Downstream User Compliance

5.1 Downstream users obligations

According to Art.31 the extended safety data sheet (eSDS) will provide information on the conditions under which a substance can be safely used. This information is termed Exposure Scenario and encompasses information relating to environmental safety. According to Art.37.5 in the REACH regulation, the recipient of the information has to check that his operations conform to the conditions outlined in the eSDS and that, if necessary, he applies appropriate risk management measures. Further information on this can be found in Cefic's 'REACH Practical Guide on Exposure Assessment and Communication in the Supply Chains' and in ECHA's Practical Guide for Downstream Users'. Both documents do not specifically address SPERCs. Such information is given below. Section 5.2 addresses the qualitative check of whether the SPERCs communicated (as part of the Exposure Scenarios) in the safety data sheet address the uses relevant to the downstream user (or his customer) SPERCs. Section 5.3 outlines the quantitative aspects of this check.

5.2 Identifying the SPERC matching the DU's operation

In the first step, the downstream user of a substance may want to assess qualitatively whether his operation is covered by the SPERC which is part of the Exposure Scenario communicated to him via the safety data sheet. To this end, the downstream user checks whether the SPERC is identical with the SPERC that the downstream user has identified to be relevant for the operation in which he uses the substance.

This requires knowledge of the SPERC(s) relevant to the operation(s). Typically, smaller businesses operate one or a few similar processes and the number of relevant SPERCs is small. Hence, a downstream user may have to identify the limited number of SPERCs that are relevant for his operation. This includes checking whether the operational conditions and risk management measures implemented in his operation match with the SPERCs. To that end, the SPERC factsheets could be used. Alternatively, the sector organizations of the formulators of end use products could issue targeted information for their members and the customers of their members. Such publications could be helpful by leaving aside the assessment detail presented in the SPERC factsheets and by focusing on the operational conditions and risk management measures instead.

5.3 Scaling

Upon concluding that the own operation is covered qualitatively by a SPERC. The quantitative part of the evaluation can be started. This quantitative evaluation is termed 'Scaling'. For SPERC-based environmental assessments it answers the set of conditions prevailing in the DU's operation are covered by the set of conditions communicated in the suppliers SDS. This question is particularly relevant if the supplier has indicated in his safety data sheet that quantitative matching is appropriate for the use described by the SPERC. In most cases the combination of factors such as local amount used, risk management measures implemented and dilution of wastewater in the sewer and receiving river will be compared.

Currently, the discussion on scaling is not concluded. For that reason this document does not go into any more detail on this topic.

5.4 What to do if a use is not covered by a SPERC?

If an actor in the supply chain concludes that a certain use is not covered by a SPERC, there is the possibility to address this issue in the relevant trade association and to stimulate the development and publication of a SPERC according to the mechanism outlined above. Guidance on developing SPERC factsheets is provided in section 6.

6 Developing SPERCs and making them available

6.1 Quality criteria for SPERC derivation and documentation

SPERC factsheets are intended to provide the background documentation of the thoughts underlying a SPERC. Table 6.1 summarizes the elements which need to be addressed in a SPERC factsheet to be of sufficient quality. These elements need to be addressed in order to enable registrants, and downstream users to properly apply SPERCs. In addition, the quality criteria for SPERCs are to support authority representatives in understanding the proper application of SPERCs.

Table 6.1. List of quality criteria for SPERCs

Formal criteria
In each SPERC it should be clearly identified what processes and/or activities are covered.
Each SPERC should be identified with a unique identifier.
The standard factsheet format developed by Cefic should be used (see http://www.cefic.org/Industry-support/Implementing-reach/Libraries/).
Criteria related to content
The operational conditions which are typical for the application covered by the SPERCs should be described.
The description of the operational conditions should enable downstream user to judge whether their specific operation is covered by a SPERC.
Release factors to water, air, and soil should be provided.
If on-site risk management measures are prescribed by a SPERC, this should be clearly stated and the assumed efficiency of the RMM should be specified.
Where it applies releases to off-site waste treatment and waste management should be specified.
The reference document(s) which was (were) used as the departing point for the SPERC derivation should be cited.
Criteria related to reasoning applied in the SPERC definition
The reasoning applied in the choice of release factors should be reported in the SPERC factsheet.
If release factors are lower than those in the reference documents used for developing the SPERC, a justification should be provided.
If release factors are set to zero, a justification relating to the operational conditions should be provided. If the release factor to soil is set to zero, a standard justification suffices.
Criteria related to the availability of SPERCs
Industry associations should maintain and update the SPERC factsheets. (all versions of SPERCs should be kept available).

6.2 Information sources available for SPERC development

Several sources of for information on typical processes and emission rates can be used as starting point for development of SPERCs. The most relevant are the OECD Emission Scenario Documents (ESDs), Best Available Technology Reference Documents (BREFs) and emission values from the A- and B-tables of the Technical Guidance Document on Risk Assessment (European Chemicals Bureau, 2003). . Additional resources can be monitoring data, market research data and questionnaires at sector association level.

6.3 The SPERC Development process

Setting up an expert group. Based on the experience made so far, the SPERC development process starts with setting up a group of individuals who are knowledgeable about the processes and related emissions. In the past, these individuals have frequently been recruited from member companies of sector organisations. In certain instances sector associations involved consultants as well.

Collect information and compile into factsheet. The first task handled by this group is the identification of the process which is covered by a SPERC and by identifying suitable starting information. Subsequently, this information is evaluated with regard to suitability for the SPERC development. From the reference documents relevant pieces of information (release factors, operational conditions and risk management measures) are selected and compiled for documentation into the SPERC factsheets.

Quality-check and publish SPERC factsheet. Once the selection and compilation of the SPERC factsheet is completed, the draft factsheets should be quality assessed based on the criteria outlined above. This quality assessment should be performed by a broader group of individuals from the sector organization which holds the responsibility for the SPERC. Upon successful completion of the quality assessment, the SPERC factsheets can be published on the sector organization's homepage and the Cefic Exposure Scenario working group needs to be informed.

6.4 Guidance on documenting SPERCs in SPERC factsheets.

As outlined above the information describing a SPERC is summarized in a SPERC factsheet. The factsheet contains 12 sections as indicated in Table 3.1. Below instruction for providing appropriate information for all sections is given such that the quality criteria for a SPERC factsheet (see above) are met.

Title of SPERC: This section is to specify the title of a SPERC as a string of text.

SPERC code: This section is to specify the unique code for the SPERC. For unequivocal identification of SPERCs the coding system outlined in Chapter 1.5 of this document is used.

Scope: This section is to specify domain of applicability of the SPERC. This information is to inform the downstream user of the SPERC information such that he can decide whether the SPERC relates to his operation.If relevant please provide information on
• User groups (if not already obvious from Title)
• Substance groups or functions (e.g. solvents, additives)
• Processing conditions (e.g. manufacturing or processing of solvent-borne mixtures, manufacturing or processing of water-borne mixtures, processing of solids, dry processing, no high temperatures)

If relevant, specify explicitly which conditions or processes are not covered

Related use descriptors: This section is to specify the use descriptors (SU, PROC, PC, ERC, AC) which correspond to the use described in the SPERC factsheet.

Operational conditions: Please provide a clear description of the operational conditions that determine the emission. These are communicated in phrases.

In free-text please provide a specification of concepts such as efficient use of resources by quantified indicators (e.g. % of raw materials use) or qualitative conditions (e.g. processing techniques).

Obligatory onsite RMMs: Please provide in phrases:
Clear description of risk management measures that are to be applied and the existence of which is assumed in the release factors. Explicitly state, if no RMM is required.

Please provide numerical values of the efficiency of the phrases.

Substance use rate: Please provide (a) numerical value(s) of an indicative realistic worst case estimate of the amount of a substance used per day at a typical site (= M_{SPERC}).

Days emitting: Please provide a numerical value of a typical value of the number of days at which the process is operated and emissions occur.

Release factors: Two sets of information are to be provided. The release factors as numeric values. This set of information consists of the fractions of the substance used in the process, which are released to air, water, and soil. A fourth release factor to waste may need to be specified if, as a result of obligatory risk management measures, a fraction of the substance is diverted to waste. In addition, a free text justification for the values by reference to literature or methods or by providing the rationale behind the derivation of the value.

It may prove useful to provide direct links to related documents or to document the reasoning applied in adapting the information in the reference document, the rationale for setting the release factors.

Optional risk management measures for iteration: If relevant, please provide in phrases:
Clear description of risk management measures that are intended as a recommendation.
Please provide numerical values of the efficiency of the optional risk management measures.

Note, specifying optional risk management measures is to guide downstream user in selecting risk management measures he might want to apply in case of that he is not covered by the SPERC-based Exposure Scenario.

Narrative description: Please provide in a concise free text description. Relevant items to be specified are:

- Abstract description of full process (e.g. storage, automated pumping of substances to mixing vessels, continuous or batch wise processing, automated packaging, cleaning of equipment, local exhaust ventilation)
- Explicit mentioning of whether or not cleaning of equipment and side activities are covered.
- Unambiguous description of conditions regarding waste management and wastewater discharges (e.g. if there are no restrictions in scope, statement that any type of waste disposal is covered).

Scaling: This section provides the information required for the quantitative evaluation of whether the use of a substance in own (i.e. specific) operation is covered by the generic set of conditions, which is defined by the SPERC. This quantitative evaluation is termed ‘Scaling’. This section can include the scaling equation relevant to the SPERC, a reference or a link to a scaling tool, the parameters by which the SPERC can be scaled to site specific conditions, etc.

6.5 Making SPERCs available.

The SPERC factsheets are the product of the SPERC development. They are published as reference information on the homepages of the associations / trade groups. The factsheets provide the comprehensive background information, which justifies the improved emission estimation (in comparison with the ERCs). They are meant as reference documents for those

(registrants, consultants, dossier evaluators) that want to obtain detailed information on the assumptions and justifications underlying the SPERCs. Due to their comprehensive nature, the SPERC factsheets are not suitable to be communicated in the supply chain. Rather, the relevant pieces of information used and made available for a targeted audience, as outlined in Table 6.2 should be communicated.

As outlined above, the SPERCs are meant to support the registrants by providing them with downstream knowledge on emissions to the environment. To that end, the registrants (and their consultants) need to be made aware of the existence of the SPERCs. This is done via the overview of the SPERCs which is published on the Cefic homepage and via the so-called use mappings, which detail which SPERCs belong to which uses. The use mappings are available on the homepages of the associations / trade groups.

Via making the SPERCs available as CHESAR import files, the sector organizations / trade groups enable CHESAR users to carrying out chemical safety assessments and to generate chemical safety assessments in a process which requires very limited manual data entry from the environmental part of the assessment. SPERCs are also available in several assessment tools (ECETOC TRA, etc. see Table 4.1). This also supports the registrants (or their consultants) in carrying out chemical safety assessments.

SDSs with their annexes are the source of information to the downstream users. These documents instruct the downstream user about applicable operational conditions and risk management measures and about the limits within the emissions from their operations are covered by the relevant SPERC.

One or two additional sets of communication are considered essential to broaden the knowledge on SPERCs among downstream users. The sector organizations which own the SPERC should issue these in order to target their membership and the customers of their membership. These communications should create awareness about the existence of SPERCs and provide guidance on the audiences (primarly formulators of end use products, and their customers) are expected to handle the information they receive with the safety data sheet. By including examples which are specific for the respective audience, the principles outlined in Section 5 of this document can be illustrated. Such communications will be helpful by leaving aside those details in the SPERC factsheets which is relevant for downstream users and by focusing on how downstream users compare operational conditions and risk management measures detailed in the safety data sheets with the conditions prevailing in their own operation.

Table 6.2: Overview of the different channels via which SPERC information is made available. The table outlines the source of SPERC information, the specific content and the respective addressee.

Source	Purpose	Content	Addressee
Cefic homepage*	Provide overview of SPERCs available, provide links to more detailed information	SPERC identifiers SPERC titles	Registrants, consultants
Use mappings**	Provide information on the relation between uses and emissions estimation via SPERCs	SPERC identifiers	Registrants, consultants
Exposure Assessment Tools***	Provide input for environmental risk assessment of specific substances.	SPERC identifiers default values for assessment parameters,	Registrants, consultants.
Annex to SDS	Inform downstream users of the operational conditions and risk management measures as defined in SPERCs.	SPERC identifiers, operational conditions (as phrases), risk management measures (as phrases), scaling information (limits, tools and parameter values)	Downstream users
Chemical Safety Report	Document the input and output of the environmental risk assessment of specific substances.	SPERC identifiers, operational conditions, (as determinants), risk management measures (as determinants), determinant descriptions, default for assessment parameters, outcome of the assessment (PECs, RCRs, M_{Safe})	Authorities
CHESAR SPERC files**	Provide input for environmental risk assessment of specific substances, document OCs and RMMs in CSRs	SPERC identifiers, operational conditions, (as determinants), risk management measures (as determinants), determinant descriptions, default for assessment parameters, justifications for release factors.	CHESAR users
SPERC factsheet**	Reference document, comprehensive documentation of SPERCs and underlying information.	SPERC identifiers (including related use descriptors), operational conditions, (as determinants and phrases), risk management measures (as determinants and phrases), determinant descriptions, default for assessment parameters, justifications for release factors.	Registrants Consultants Authorities:

- * http://www.cefic.org/Industry-support/Implementing-reach/Libraries/
- ** for web-addresses please refer to Table 1.2.
- *** see Table 5.1

Appendices

Appendix 1: SPERC Factsheet Examples

Appendix 1a –Industrial use of Me-salts in Conversion Coating

Section	Content	
SPERC Title		
	Industrial use of Metal Salts in conversion coating	
SPERC code		
	AISE SPERC 5.1a.v1 – Industrial use of Me-salts in Conversion Coating – Nickel AISE SPERC 5.1.b.v1 – Industrial use of Me-salts in Conversion Coating – Zinc, Chromium, Copper, Manganese	
Scope		
	Covers the use of metal salts in a broad range of specific applications, e.g. surface treatment, metal treatment, surface finishing, corrosion inhibition etc. This includes the core process of treating the metal substrate as well as those processes required to support the core process such as storing, mixing, equipment cleaning, maintenance and associated laboratory activities. The treatment of the metal parts can occur by bathing or by spraying. The SPERCs are relevant for operations which discharge their wastewater to treatment by a municipal sewage treatment plant. *Substance Domain:* Metal salts	
Related use descriptors		
	Main User Group: SU 3	
	Sector of Use:	
	Environmental Release Class: ERC 5	
	Process Categories: PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9 PROC10, PROC13, PROC15.	
	Product categories: PC 14	
Operational conditions		**Operational conditions – Phrases**
	AISE 5.1a.v1 AISE 5.1.b.v1	Indoor Use. [OOC1] Water-Based Process. [OOC12] Product applied in aqueous process solution with negligible volatilization. [OOC23] Spent fluid discharged to wastewater. [OOC19]
		Operational conditions - Free text background

	AISE 5.1a.v1 AISE 5.1.b.v1	General good practice: e.g. trained staff, spill protection including waste reuse. Sites are operated to meet the local requirements for emissions of metals. Reduced emissions to waste water due to e.g.: Re-use of rinsing water The metal salts are dissolved in a water-borne application fluid, which is kept in a reservoir. It is pumped to dedicated machine(s) in order to be applied to the substrate or it is kept in a bath. With each piece of substrate a fraction of the application fluid is carried-over from the treatment bath. Via a sequence of rinsing steps this fraction of the application fluid is continuously emitted to the wastewater.			
Obligatory onsite RMMs		**RMM - Phrase**	**RMM-Efficiency (RE_{SPERC})**		
	AISE 5.1a.v1	1 (pH adjustment [9313214801], and precipitation [11137200302])	95		
	AISE 5.1.b.v1		99		
Substance use rate		Phrase	Value		
	AISE 5.1a.v1 AISE 5.1.b.v1	Indicative substance use rate in a typical operation (M_{SPERC} in kg/d) [new phrase]	50		
	Justification				
	M_{SPERC}-represents an indicative worst case value for the substance use rate per site. The amount of metal salt used for the daily replenishment constitutes the substance use rate. The rinsing of the metal parts results in a loss of process water. The volume of process water lost by rinsing is continuously each day and the concentration of the metal salts is adjusted accordingly. See M_{SPERC}-derivation in Appendix.				
Days emitting		Phrase	Value		
	AISE 5.1a.v1 AISE 5.1.b.v1	Emission Days (days/year): [FD4]	220		
Release factors		Values (per pathway)			
		To air	To water	To soil	To waste
	AISE 5.1a.v1 AISE 5.1.b.v1	0	1	0	0.99
		Justification			
	Releases to Air: Metal salts in aqueous solutions are involatile and are intended to remain in the application solution. Volatilization of metal salts is therefore negligible.				

	Spray applications are housed-in for the sake of worker protection. For the reasons above, the release factor to air is set to zero. Releases to water via wastewater: The spent process fluid consists of the rinsing, which contain the metal salts. As a first conservative approximation it assumed that the amount of metal salt is quantitatively lost from the process to the spent process water. Releases to soil: Releases to soil do not occur during normal operation of the process. Releases to waste: The treatment of the spent process fluids by pH-adjustment and subsequent filtration/sedimentation results in slurries or solid waste which is treated off-site. The content of the reservoir is disposed of once or twice per year and is treated off-site.		
Optional risk management measures		Type of RMM	Efficiency
	AISE 5.1a.v1	pH adjustment [9313214801], and Sedimentation of solids by air flotation [9267234023],	95
	AISE 5.1.b.v1		99
	AISE 5.1a.v1	(pH adjustment [9313214801], and Sedimentation of solids by filtration, [9267234024]	95
	AISE 5.1.b.v1		99
	The optional risk management measures listed here are technical alternatives to the RMMs listed under the obligatory on-site risk management measures.		
Narrative description	**Industrial Use of Metal Salts**		
	This SPERC describes SPERC parameters relevant to the Industrial Use of Metal Salts in a water-based process for surface treatment, surface finishing, conversion coating etc.		
Scaling	Scalable parameters	Parameter description	Values – SPERC /ES
	$M_{Site, SPERC}$ (kg/d)	Amount which can be safely used based on the SPERC	M_{Safe} (kg/d) – outcome of chemical safety assessment
	$RE_{Total, SPERC}$	Removal efficiency assumed in the SPERC	0
	AISE 5.1a.v1		0.95
	AISE 5.1.b.v1		0.99
	q_{SPERC}	Factor by which receiving surface water dilutes the sewage after treatment	10

	$G_{Effluent, SPERC}$ (m^3/d)	Volume of sewage treated per day (m^3/d)	2.000
		Scaling condition	
		risk driven by wastewater treatment plant microbes $[M_{Site,SPERC} \times (1 - RE_{Total, SPERC})] / G_{Effluent, SPERC} \geq [M_{Site,Site} \times (1 - RE_{Total, Site})] / G_{Effluent, Site}$	
		risk driven by freshwater/freshwater sediments, marine water/marine water sediments $[M_{Site,SPERC} \times (1 - RE_{Total, SPERC})] / (G_{Effluent, SPERC} \times q_{SPERC}) \geq [M_{Site,Site} \times (1 - RE_{Total, Site})] / (G_{Effluent, Site} \times q_{Site})$	
	Site-specific parameters	Parameter description	Values – Site
	$M_{Site, Site}$ (kg/d)	Amount which is actually used on-site	To be determined by Downstream User
	$RE_{Total, Site}$	Removal efficiency realized through RMMs on site	
	q_{Site}	Factor by which receiving surface water dilutes the sewage after treatment	
	$G_{Effluent, Site}$	Volume of sewage treated per day (m^3/d).	

Appendix: M_{SPERC}-Derivation

*M_{SPERC} is calculated according to: $\mathbf{M_{SPERC} = Q_{Applicaton\ Fluid} \times C_{SP} \times F_{Dilution}}$. Wi th C_{SP} = Concentration of substance in finished product, $\mathbf{Q_{ApplicatonFluid}}$ = the consumption of application fluid, $F_{Dilution}$ = the factor by which the metal salt-containing product is diluted to yield the application fluid.

The numbers in parentheses are the M_{SPERC}-values, which are recommended as starting values for environmental exposure assessments, provided no better information is available.

Table 1: Derivation of the default substance use rate M_{SPERC} for *Industrial use in formulation of liquid cleaning and maintenance products*. The derivation is based on 2 sets of typical values of the operational conditions for the various applications covered by this SPERC.

SPERC	**Other Operational Conditions – Phrase**	**Operational Conditions – Values for selected parameters expressing the operational conditions for the SPERC 'industrial use – formulation of granular cleaning and maintenance products.**			
		M_{SPERC} in kg/d	Q_{AF} Consumption of application fluid (m^3/d)	C_{SP} Substance concentration in product (in % weight)	$F_{Dilution}$ % of product in application fluid
AISE 5.1a.v1		50	5	25	4
AISE 5.1.b.v1		50	5	10	10

SPERC 5.1a.v1 AISE - - Industrial use of Me-salts in Conversion Coating – Nickel
List of Qualitative Chesar determinants
Qualitative determinants (conditions of use linked to initial release factors)

Determinant Label	de-fault	Value	Description of Value	Use con-dition type	Phrase Text
Type of Process		Substance applied in aqueous process solution with negligible volatilization		E-w-3*	Product applied in aqueous process solution with negligible volatilization.
Indoor/outdoor use	x	Indoor Use		E-w-3*	Indoor
Process efficiency		Optimized water use due to e.g.: Re-use of rinsing water		E-w-3*	Maximize waste water reuse
Chemical waste - continuous generation		Waste resulting from on-site RMM to be disposed as chemical waste		E-w-5*	Waste resulting from on-site RMM to be disposed as chemical waste
Chemical waste - discontinuous generation	x	Spent process fluid to be disposed of as chemical waste	Processing fluid can be kept in reservoir or treatment baths. Periodically, the reservoirs are emptied of the spent reservoir fluid and refilled with fresh reservoir fluid. The spent reservoir fluid is treated as chemical waste. Operators minimize the frequency of exchanging the reservoir fluid to reduce the cost of process chemicals, waste treatment and equipment downtime.	E-w-5*	Spent process fluid to be disposed of as chemical waste

SPERC 5.1a.v1 AISE - - Industrial use of Me-salts in Conversion Coating – Nickel

RMM determinants (NOT linked to initial release factors).

Determinant Label	de-fault	Qualitative value	Description of value	Effectiveness in % (default, min-max) for water and/or air	Use con-dition type	Phrase Text
On site treatment of wastewater		pH-adjust-ment and sub-sequent filtration / sedimentation – Ni-salts		water: 95	E-w-3*	Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange

SPERC 5.1b.v1 AISE - - Industrial use of Me-salts in Conversion Coating –Zinc, Chromium, Copper, Manganese
List of Qualitative Chesar determinants

Determinant Label	de-fault	Value	Description of Value	Use con-dition type	Phrase Text
Type of Process		Substance applied in aqueous process solution with negligible volatilization		E-w-3*	Product applied in aqueous process solution with negligible volatilization.
Indoor/outdoor use	x	Indoor Use		E-w-3*	Indoor
Process efficiency		Optimized water use due to e.g.: Re-use of rinsing water		E-w-3*	Maximize waste water reuse
Chemical waste - continuous generation		Waste resulting from on-site RMM to be disposed as chemical waste		E-w-5*	Waste resulting from on-site RMM to be disposed as chemical waste
Chemical waste - discontinuous generation	x	Spent process fluid to be disposed of as chemical waste	Processing fluid can be kept in reservoir or treatment baths. Periodically, the reservoirs are emptied of the spent reservoir fluid and refilled with fresh reservoir fluid. The spent reservoir fluid is treated as chemical waste. Operators minimize the frequency of exchanging the reservoir fluid to reduce the cost of process chemicals, waste treatment and equipment downtime.	E-w-5*	Spent process fluid to be disposed of as chemical waste

List of Quantitative Chesar determinants

RMM determinants (NOT linked to initial release factors).

Determinant Label	de-fault	Qualitative value	Description of value	Effectiveness in % (default, min-max) for water and/or air	Use con-dition type	Phrase Text
On site treatment of wastewater		pH-adjust-ment and sub-sequent filtration / sedimentation Metal salts other than Nickel		water: 99	E-w-3*	Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange

Appendix 1b –Formulation & (re)packing of substances and mixtures – Industrial (Solvent-borne)

General Information	
Title of Specific ERC	Formulation & (re)packing of substances and mixtures (industrial): solvent-borne
Applicable ERC	2 – Formulation of preparations
Responsible	ESIG/ESVOC
Version	V1
Code	ESVOC 2.2.v1
Scope	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. *Substance Domain*: Applicable to petroleum substances (e.g., aliphatic and aromatic hydrocarbons) and petrochemicals (e.g., ketones, alcohols, acetates, glycols, glycol ethers, and glycol ether acetates). *Size of installation*: Use rate assumed to be 100000 kg/d *Processing conditions:* Dry process
Coverage	Process Categories: 1 (use in closed process, no likelihood of exposure), 2 (use in closed, continuous process with occasional controlled exposure), 3 (use in closed batch process (synthesis or formulation)), 4 (use in batch and other process (synthesis) where opportunity for exposure arises), 5 (mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)), 8a (transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities), 8b (transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities), 9 (Transfer of substance or preparation into small containers (dedicated filling line, including weighing)), 14 (Production of preparations or articles by tableting, compression, extrusion, pelletisation),15 (use as laboratory reagent)

	Characteristics of specific ERC	Type of Input Information
Operational Conditions	Indoor use. Solvent-based process. Process optimized for highly efficient use of raw materials (very minimal environmental release). Volatile compounds subject to air emission controls. Negligible wastewater emissions as process operates without water contact. Negligible air emissions as process operates in a contained system. Wastewater emissions generated from equipment cleaning with water.	
Obligatory onsite RMMs	Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. *via* oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances	
Substance Use Rate	The substance maximum use rate in a typical operation (M_{SPERC}) is 100000 kg/d	Typical maximum site tonnage, based on sector knowledge*
Days Emitting	300 days/year	Default 'Formulation' – Tonnage > 2000 tonnes/year[1]
Environmental Parameters for Fate Calculation	Assumed dilution factor in freshwater is 10. For marine assessments an additional tenfold dilution is assumed, i.e., dilution factor in marine water = 100.	ERC default settings[2]

*A use rate of 100000 kg/d over 300 days is equivalent to 30000 tonnes annually; which is consistent with the maximum capacity for a 'major' lubricant producing plant (OECD Lubricants & Lubricant Additives ESD, 2004).
http://www.oecd.org/document/55/0,3746,en_2649_34379_47582135_1_1_1_1,00.html

[1]ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Section R.16.3.2.1
[2]ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Section R.16.6.3
http://echa.europa.eu/documents/10162/17224/information_requirements_r16_en.pdf

	Characteristics of Specific ERC		Justification
Emission Fractions (from the process)	***To Air***	**f (vapor pressure)**	Estimates on the basis of substance vapor pressure taken from EUTGD (2003) Appendix 1[3]. These values are consistent with the range of emissions reported in OECD Coatings ESD[4] and consistent with EU Solvent Emissions Directive after typical RMMs as further documented in *Coatings SPERC Factsheet*.
	VP > 1000 Pa	0.025	
	VP 100-1000 Pa	0.01	
	VP 10-100 Pa	0.005	
	VP < 10 Pa	0.0025	
	To Wastewater/Sewer/ Water courses	***f* (water solubility)**	Emission factors to wastewater are conservatively calculated based on wastewater volume generated from cleaning operations and substance aqueous solubility *Assumption of 5 m^3 of wastewater generated per 1 tonne of substance used is relatively conservative.*[6] *Example: 1 mg/L x 5 m^3/tonne use x 1000 L/m^3 x 1tonne/10^9mg = 0.000005 tonnes/tonne used. For WS range (e.g., 1-10 mg/L), the geometric mean (i.e., 3.2 mg/L) is used to calculate the fraction released.* OECD Coatings ESD[4] reports no releases of volatile substances to water. The values used here are consistent with those reported for dust.
	WS < 1 mg/L	0.000005	
	WS 1-10 mg/L	0.00002	
	WS 10-100 mg/L	0.0002	
	WS 100-1000 mg/L	0.002	
	WS >1000 mg/L	0.005	
	To Soil	0.0001	ERC2 default[7]

[3]European Commission Technical Guidance Document on Risk Assessment (EUTGD) Part 2 – 2nd Edition (2003). Appendix 1 Polymers Industry, Table 2.1 (MC = 3). http://ihcp.jrc.ec.europa.eu/our_activities/health-env/risk_assessment_of_Biocides/doc/tgd/tgdpart2_2ed.pdf

[4]OECD Series on Emission Scenario Documents, Number 22. July 2009. Emission Scenario Documents on Coating Industry (Paint, Laquers and Varishes).
[5]OECD Series on Emission Scenario Documents, Number 10. November 2004. Emission Scenario Document on Lubricants and Lubricant Additives.
[6]Data from OECD Lubricants & Lubricant Additives ESD (2004) suggest a reasonable worst case estimate of wastewater discharge for a blending plant (formulation) is 0.1 m^3/tonne lubricant[5]; thus, assumed value of 5 m^3/tonne represents a conservative estimate.

http://www.oecd.org/document/55/0,3746,en_2649_34379_47582135_1_1_1_1,00.html

[7]ECHA Guidance on information requirements and chemical safety assessment, Chapter R.16: Environmental Exposure Estimation, Appendix R.16-1 – Environmental Release Categories

	Type of RMM	Typical Efficiency
Appropriate Risk Management Measures (RMM) that may be used to achieve required emission reduction	***Air***	
	On-site Technology Wet scrubber – gas removal Air filtration – particle removal Thermal oxidation Vapor recovery – Adsorption *Other*	 70% 80 – 99+% (efficiency range; no typical value reported)[5] 98% 80% Default efficiencies of the RMMs according to Cefic Risk Management Library and [5]*IPPC 2009 draft BREF on Common Waste Water & Waste Gas Treatment/Management Systems in the Chemical Sector*. *A default value of 0% was selected on the basis that emission fractions obtained from the EUTGD (2003) as presented above already incorporate typical air RMMs.
	Water	
	Offsite Technology Municipal wastewater treatment plant	The removal efficiency of a sewage treatment plant can be estimated. The standard estimation is via the SimpleTreat module of EUSES or ECETOC TRA. *Specific substance efficiency calculated via SimpleTreat and is assumed to represent default removal efficiency.
	Onsite Technology Distillation (*of used process solvent; prior to any water contact*) Acclimated biological treatment *Other*	The efficiency of the RMMs varies dependent on the treatment technology and the properties of the substance. The standard RMMs encountered in the processes considered here typically provide removal efficiencies in excess of 80% (according to Cefic Risk Management Library) For readily and inherently biodegradable substances, the removal efficiency for acclimated biological treatment may be significantly higher than SimpleTreat estimates; thus, SimpleTreat estimates can serve as a conservative lower bound.[6] Substance-specific efficiencies can be considered.

[5] http://eippcb.jrc.es/reference/cww.html

[6] http://www.aromaticsonline.net/Downloads/WWTP.doc

Narrative Description of Specific ERC

Formulation of solvent-borne substances encompasses a wide range of activities such as transfers, mixing, tableting, compression, pelletilisation and sampling. Substance losses are reduced through use of general and site-specific risk management measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered equipment/processes to minimize evaporative losses of VOCs. Substance losses to waste water are generally restricted to equipment cleaning as processes operate without contact with water Such uses and substance properties result in limited to no discharge to wastewater or to soil from the industrial site.

Safe Use

Communication in SDS

The REACH registrant establishes a set of standard conditions of safe use for a substance (for industrial use of a solvent-borne processing aid) by adopting the conditions specified in this SPERC and recommending a Required Removal Efficiency (RRE) for adequate risk reduction. If RRE = 0, wastewater emission controls (beyond those specified by the operational conditions) are not required to ensure safe use of the substance. If > 0, the RRE may be achieved via offsite municipal sewage treatment (providing substance removal efficiency, $RE_{Offsite}$) and/or onsite emission controls (providing substance removal efficiency, RE_{Onsite}). Multiple onsite emission reduction technologies can also be considered, if necessary and applicable (e.g., $RE_{Onsite} = 1 - [(1 - RE_{Onsite,\ 1}) \times (1 - RE_{Onsite,\ 2}) \times$ etc.], where $RE_{Onsite,\ n}$ represents the substance removal efficiency for each onsite emission reduction technology). For direct comparison to the RRE, a total substance emission reduction efficiency (RE_{Total}) is calculated ($RE_{Total} = 1 - [(1 - RE_{Onsite}) \times (1 - RE_{Offsite})]$. An $RE_{Total} <$ RRE is indicative of the safe use of a substance.
Removal efficiency requirements, as dictated by the assumed operating conditions, are documented in the Chemical Safety Report and communicated in the Safety Data Sheet. All other parameters underlying a substance exposure scenario based on the SPERC 'Formulation &re (packing) of substances and mixtures – industrial (solvent-borne)' are implicitly referred to via the reference to this SPERC.

Scaling

Wastewater

The users of solvent-borne processing aids are responsible for evaluating the compliance of their specific situations with the registrant's information. To that end, the users need to know their site-specific substance use rate (M_{Site}) and days emitting ($T_{Emission,\ Site}$), onsite and offsite emission controls and subsequent total substance emission reduction efficiency ($RE_{Total,\ Site} = 1 - [(1 - RE_{Onsite,\ Site}) \times (1 - RE_{Offsite,\ Site})]$), sewage treatment plant effluent flow rate ($G_{Effluent,\ Site}$) and receiving water dilution factor (q_{Site}). Adequate control of risk exists if the following relevant expression holds true:

for risk driven by wastewater treatment plant microbes

$[M_{SPERC} \times (1 - RE_{Total,\ SPERC})] / G_{Effluent,\ SPERC} \geq [M_{Site} \times (1 - RE_{Total,\ Site})] / G_{Effluent,\ Site}$

for risk driven by freshwater/freshwater sediments, marine water/marine water sediments

$[M_{SPERC} \times (1 - RE_{Total,\ SPERC})] / (G_{Effluent,\ SPERC} \times q_{SPERC}) \geq [M_{Site} \times (1 - RE_{Total,\ Site})] / (G_{Effluent,\ Site} \times q_{Site})$

for risk driven by secondary poisoning (freshwater fish/marine top predator) or indirect exposure to humans (oral)

$[M_{SPERC} \times T_{Emission,\ SPERC} \times (1 - RE_{Total,\ SPERC})] / (G_{Effluent,\ SPERC} \times q_{SPERC}) \geq [M_{Site} \times T_{Emission,\ Site} \times (1 - RE_{Total,\ Site})] / (G_{Effluent,\ SPERC} \times q_{Site})$

It is simpler and thus may be preferable to some users to compare M_{Site} with M_{Safe} (*the maximum tonnage that can be safely used, within the prescribed operating conditions, OC_{SPERC} and RMM, $RE_{Total, SPERC}$*). Adequate control of risk exists if the following conditions are met [$RE_{Total, Site} \geq RE_{Total, SPERC}$, $G_{Effluent, Site} \geq G_{Effluent, SPERC}$, and $q_{Site} \geq q_{SPERC}$] and $M_{Safe} \geq M_{Site}$.

Local amount used, emission days per year, receiving water flow rate (or dilution factor), sewage treatment plant effluent flow rate, and risk management measure removal efficiency are the adjustable parameters for emission assessment. These parameters can be refined using site-specific information, which often is obtainable with limited effort and expertise. Adjusting the assessment by refining these parameters is referred to as scaling. Scaling is applied to evaluate compliance of a specific use with a generic Exposure Scenario. For that reason, site parameter values which deviate from the default values need to reflect the actual situation.

The release factors are an additional set of adjustable parameters; however, refining the default values requires significant justification and, thus, is beyond the boundary conditions defined in the SPERC Factsheet. For that reason, release factor refinements do not constitute a SPERC-based assessment and must be considered an element of downstream user chemical safety assessment.

Appendix - Determinant List
ESVOC 2.2.v1 Formulation & (re)packing of substances and mixtures – Industrial (Solvent-borne)

Qualitative determinants (conditions of use linked to initial release factors)

Determinant Label	de-fault	Value	Description of Value	Use con-dition type	Phrase Text
Air treatment technology	x	Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. Thermal wet scrubber – gas removal and/or air filtration – particle removal and/or thermal oxidation and/or vapor recovery – adsorption		E-w-3*	Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. Thermal wet scrubber – gas removal and/or air filtration – particle removal and/or thermal oxidation and/or vapor recovery – adsorption
Indoor/outdoor use	x	Indoor Use		E-w-3*	Indoor
Process efficiency	x	Process optimized for highly efficient use of raw materials (very minimal environmental release)		E-w-3*	Process optimized for highly efficient use of raw materials (very minimal environmental release)
Equipment cleaning	x	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water		E-w-3*	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water

ESVOC 2.2.v1 Formulation & (re)packing of substances and mixtures – Industrial (Solvent-borne)

RMM determinants (NOT linked to initial release factors). Please note that the determinant 'Distillation of used process solvent' is not operational yet in Chesar. It was developed to allow quantification of mass flows of a substance to waste.

Determinant Label	de-fault	Qualitative value	Description of value	Effectiveness in % (default, min-max) for water and/or air	Use con-dition type	Phrase Text
Further onsite technology	x	Not applied		Water 0%, Air 0%	E-w-3*	Not applied
Further onsite technology		Distillation of used process solvent	The efficiency of the RMMs varies dependent on the treatment technology and the properties of the substance. The standard RMMs encountered in the processes considered here typically provide removal efficiencies in excess of 80% (according to Cefic Risk Management Library)	Waste 80 %	E-w-3*	Distillation of used process solvent
On site treatment of wastewater	x	Not applied		Water 0%	E-w-3*	Not applied
On site treatment of wastewater		Acclimated biological treatment	For readily and inherently biodegradable substances, the removal efficiency for acclimated biological treatment may be significantly higher than SimpleTreat estimates; thus, SimpleTreat estimates can serve as a conservative lower bound.	Water 70%	E-w-3*	Acclimated biological treatment

Appendix 2: Chesar determinants and SPERCs

The Chesar Data Structure

The Chesar data structure for conditions of use is based on so-called determinants. A "determinant" is a specified condition or measure driving the exposure of man or environment to a substance, e.g. the amount of substance used per day at a site or a waste water treatment installed at an industrial site. A "determinant type" is a set of information systematically characterising a determinant (including meta-data) and defining the values it can take (Table A2.1). The individual information elements are explained below.

In the Chesar SPERCs files the information from the SPERC factsheets is organized according to the Chesar data model. Table A2.2 provides an overview and explanation of the information elements as well as the mapping of information between the SPERCs in Chesar and the SPERC factsheets.

Both SPERCs and determinant types are meant to be used across various assessments and by this contribute to harmonisation and efficiency of assessments. In Chesar the determinants and the SPERCs are kept in separate libraries and managed via the so-called Box 6[2].

More detail on creation and use of determinant types, determinants and SPERCs in Chesar is available under http://Chesar.echa.europa.eu/web/Chesar/support/manuals-tutorials, namely in "Chesar 2 user manual 6: Libraries".

Information elements forming a determinant

Determinant categories

Chesar defines three categories of determinant types: 'quantitative determinants', 'qualitative determinants' and 'RMM with effectiveness':

- Quantitative determinants enable the reporting of a condition of use in the form of a numerical value;
- Qualitative determinants enable the reporting of conditions of use in a qualitative way (text);
- RMM with effectiveness determinants enable the reporting of risk management measures (text) with a numerical effectiveness value.

Each determinant type needs to be assigned to one of the categories[3]. Examples of determinants which are relevant for SPERCs are provided along with the SPERC factsheet examples. These can be found in Appendix 1 and exemplify qualitative determinants and RMM with effectiveness determinants.

'Qualitative determinants' do not provide an efficiency value; here the conditions of use are reported in the form of text. The release reduction caused by measures or conditions described via this category is part of the initial release factor and cannot be modified by the assessor at single registrant's level. This may include already typical risk management measures integrated into the process conditions.

[2]Chesar is divided in seven major groups of functionalities called Boxes; these allow the management of substances (Box 1), uses (Box 2), assessments (Box 3), CSR (Box 4), SDS ES (Box 5), libraries (Box 6) and users (Box 7).

[3] Values from quantitative determinants can only be taken into account by plugged-in exposure estimation tools. Therefore quantitative determinants are not to be used within SPERC. Note nevertheless that tonnage information can be reported in a SPERC and will populate the value of an existing determinant in Chesar

A 'RMM with effectiveness' can be used when a particular measure serves to further reduce the initial release from a process. Those determinants carry a set of pre-defined efficiency values, one of which is set as default. The default efficiency of the measure is used in Chesar to calculate the final release from an activity. If appropriate, the assessor may change the efficiency to another of the pre-set values that reflects the actual situation in his assessment.

Label
Each determinant has a “Label”. The label gives the determinant a name and can be used for searching in the library. Examples of labels for SPERC determinants are ‘type of process’, “process efficiency’, ‘waste treatment’, ‘on site treatment of wastewater’, etc.

Description of determinant
A determinant may have a “Description of determinant”. This information is intended to make the determinants searchable in Chesar library and to facilitate the selection of the appropriate determinant.

Exposure/release routes
An entry for “Exposure / release route” needs to be selected per determinant. Multiple routes can be selected, e.g. ‘water’ and ‘air’ for the determinant value 'Water-based process with negligible volatilization' because it describes a condition of use that has impacts on both release routes.

Use conditions’ types
An entry for “Use conditions’ types” needs to be selected per determinant. Below the options available in Chesar for the environment are listed.

Use condition type categories valid for environment
i. Activities by workers (environment)
E-w-1 Product (article) characteristics
E-w-2 Amount used, frequency and duration of use (or from service life)
E-w-3 Technical and organisational conditions and measures
E-w-4 Conditions and measures related to sewage treatment plant
E-w-5 Conditions and measures related to treatment of waste (including article waste)
E-w-6 Other conditions affecting environmental exposure
E-w-7 Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
ii. Activities by consumers (environment)
E-c-1 Product (article) characteristics
E-c-2 Amount used, frequency and duration of use (or from service life)
E-c-3 Conditions and measures related to treatment of waste (including article waste)
E-c-4 Other conditions affecting environmental exposure

Value
For each determinant, the possible content is expressed as pre-set “Value”. For example, a determinant with the label ‘process efficiency’ may include the values ‘typical process efficiency’ and ‘high process efficiency’.

Description of value
The “Description of value” provides additional information on the determinant value which will be displayed in the CSR.

Determinants and standard phrases
In Chesar one standard phrase can be assigned to each value of a given determinant. These phrases are meant for providing information in the Exposure Scenario for communication[4]. Such phrases may come from the ESCOM phrase catalog. CHESAR users who make use of the ESCOM phrase catalog will be able to generate the Exposure Scenario for communication automatically containing the standard phrases.

Table A2.1: Overview of the information elements of a Chesar determinant, and their use in Chesar, in the CSR and in an SDS.

Information	Obligatory	Displayed in CSR	Displayed In SDS
Label	Yes	Yes	No
Description of determinant	No	No	No
Determinant categories	Yes	No	No
Exposure/release routes	Yes	No	No
Use conditions' types	Yes	Yes	No
Value	Yes	Yes	No
Description of value	No	Yes	No
Standard phrase	No	No	Yes

Matching SPERC information elements to Chesar data structure

The SPERC factsheets are the documents which define SPERCs and the data elements which constitute the SPERCs. In order to provide guidance on how these data elements correspond to the Chesar data structure and can be entered into a Chesar SPERC file, Table A2.2 has been developed.

As shown in Table A2.2, the Chesar data structure distinguishes between SPERCs and sub-SPERCs. Each SPERC has at least one sub-SPERC. The SPERC consists of data elements that identify the SPERC and define its applicability, e.g. via definition of scope and use descriptors. The sub-SPERC contains the information relevant for performing and documenting the assessment. For each sub-SPERC (of a given SPERC) a set of release factors will be defined, depending on, for instance on the physical-chemical properties of the substance (vapor pressure and/or water solubility), or the conditions of use (different values of the determinants).

Also, as indicated in Table A2.2, SPERCs may or may not provide information on the

- Daily use at site (substance use rate)
- Annual use at a site

For an environmental assessment in CHESAR however this information is required. For that reason, if SPERCs do not provide the information Chesar will generate default estimates from the use tonnage based on EUSES algorithms. Chesar users can, however, overwrite the default estimates. They are recommended to do so if they have information available. Justification needs to be provided if the information deviates from the default.

Please note that in the assessment Chesar uses EUSES default value "percentage of tonnage used at regional scale", i.e. for uses at industrial sites 100% and for wide dispersive uses 10%. However, these values can be overwritten by the assessor.

[4]The standard phrase library is available in Chesar 2.1 as well as the assignment of standard phrases to determinant types. Nevertheless the generation of exposure scenarios for communication is not yet available.

Table A2.2: Chesar Box 6 elements and their relationship to SPERC factsheet information.

SPERC in CHESAR Box 6	Scope of the field in CHESAR	SPERC Factsheet	Including info from SPERC factsheet
Title and Scope			
Title	Mandatory field. Ensure consistent phrasing with the sub-SPERCs title[5]	Title	Copy/paste
Scope	Optional field and not displayed in the CSR. The scope lists the activities or process covered by the SPERC. This field is used by the assessor to search for a suitable SPERC in the library, so it is recommended to use keywords.	Keywords can be assembled from various sections of SPERC factsheet	Selecting keywords from factsheets
Description of technical process			
Description of the technical process (for CSR)	Optional field but recommended from content perspective. Short description of the technical process (and its steps) as well as the factors driving the release (including the information source). This should enable the reader of the CSR to better understand which type of use conditions drive the initial release factors for the processes/activities covered.	Narrative description	Select most relevant information
SPERC Identifiers			
SPERC Code	Mandatory	SPERC Code	Copy/paste
Link to website		Not included in Factsheet, To be filled during Chesar file creation	
PC	Dropdown list (multiple selection possible)	Related use descriptors – PCs	Copy/paste
SU	Dropdown list	Related use descriptors – SU	Copy/paste

[5]In the CSR generated by Chesar, when the SPERC is used in the environmental assessment, the title and code of the SPERC and sub-SPERC are displayed the following way (so repetitions in the SPERCs and sub-SPERCs' titles and codes should be avoided):
SPERC code – sub-SPERC code
SPERC title – sub-SPERC title

SPERC in CHESAR Box 6	Scope of the field in CHESAR	SPERC Factsheet	Including info from SPERC factsheet
ERC	Mandatory. Dropdown list.	Related use descriptors – ERC	Copy/paste
Main user group	Mandatory. Dropdown list: Industrial uses, Professional uses or Consumer uses	Related use descriptors – MUG	Copy/paste
Sub-SPERC Info – Identifiers	For each SPERC one or more sub-SPERCs must be created. Each sub-SPERC represents a different set of operational conditions (e.g. tonnage range, process efficiency, RMM applied, etc.) for the same process, which lead to different initial release factors.		
Sub-SPERC title	Mandatory. Ensure consistency with the SPERC title (should be complementary not a repetition)		
Sub-SPERC code	Mandatory. Ensure consistency with the SPERC code (should be complementary not a repetition)		
Sub-SPERC scope	Optional, not displayed in the CSR. Use keywords for selection of the appropriate sub-SPERC (within the SPERC)		
Sub-SPERC Info –Phys-Chem Applicability range			
Vapor pressure (Pa)	If relevant for the release estimate, it may be useful to define VP range to which the sub-SPERC is applicable.	Section of release factors	Select range which corresponds to release factors (if applicable)
Water solubility (mg/L)	If relevant for the release estimate, it may be useful to define WS range to which the sub-SPERC is applicable.	Section of release factors	Select range which corresponds to release factors (if applicable)
Sub-SPERC Info –Amounts Used			
Daily use amount (tonnes/day)	The daily use amount reported here can be overwritten during the assessment if i) the assessor has more realistic data or ii) if the use amount need to be limited in order to achieve control of risk. If this field is not filled in the SPERC it is calculated by Chesar.	m_{SPERC} (if available)	Copy paste

SPERC in CHESAR Box 6	Scope of the field in CHESAR	SPERC Factsheet	Including info from SPERC factsheet
Annual use amount (tonnes/year)	The annual use amount reported here can be overwritten during the assessment if the assessor has more realistic data or ii) if the use amount need to be limited in order to achieve control of risk. If this field is not filled in it is calculated by Chesar.		
Explanation on the daily use amount (for the CSR)	An explanation on the daily use amount may be necessary, e.g. to clarify that in a given process where the substance is used in a processing bath, the daily use amount only covers the daily compensation of losses but not the exchange of the whole bath (which can occur a number of times per year).	m_{SPERC} – derivation (if available)	Copy paste relevant parts, if appropriate. - Include statement of m_{SPERC} being an indicative value, if applicable.
Initial release factors			
Initial release factor to water (%)	Mandatory. Value of the initial release to water, which is the result of the application of different conditions of use. These conditions of use can be specified within the creation of the SPERC.	Release factor	Copy paste
Justification/rational for the release factor to water	Mandatory. Explanation on how the initial release factor to water has been derived: based on which data and with which calculation basis. This is important in order to understand the link between the release factor and the conditions of use.	Release factor: Justification	Copy / paste
Initial release factor to air (%)	Mandatory. See explanation above for water.	Release factor	Copy paste
Justification/rational for the release factor to air	Mandatory. See explanation above for water.	Release factor: Justification	Copy / paste
Initial release factor to soil (%)	Mandatory. See explanation above for water.	Release factor	Copy paste
Justification/rational for the release factor to soil	Mandatory. See explanation above for water.	Release factor: Justification	Copy / paste
Initial release factor to waste (%)	Mandatory. See explanation above for water.		
Justification/rational for the release factor to waste	Mandatory. See explanation above for water.		
Determinants			

SPERC in CHESAR Box 6	Scope of the field in CHESAR	SPERC Factsheet	Including info from SPERC factsheet
Determinants	Determinants can be added during the creation of sub-SPERCs (within the creation of SPERCs). Determinants can be of two types: 1) Determinants which specify the conditions of use driving the initial release factors (so called “determinants linked to the initial releases”). A value has to be selected from qualitative determinant types for the environment. These determinants cannot be modified nor removed by the assessor during the assessment; 2) Risk management measures which are applied on the top of the initial conditions of use in order to reduce the releases from the site (determinants so called “not linked to the initial releases”). A default value for the determinant is to be selected. The effectiveness of the measure impacts on the release. It is recommended to select by default a value where the measure is not applied (with an effectiveness of 0%). The assessor may decide to change the value in his assessment and select the appropriate measure.	Operational conditions Obligatory RMM Optional RMM List of determinants	Upload from library – Copy / paste into library

Appendix 3 – Extracts of Chesar- generated and SPERC-based CSRs

The examples in Appendix 3a and 3b are provided as automatically generated by Chesar once the Chesar SPERC file is used. The way the information is displayed is largely dependant on how the SPERC information has been entered into the Chesar SPERC file.

Appendix 3a –Industrial Use of Metal Salts in Conversion Coating -

9.1. Exposure scenario 1: Conversion coating at industrial site

Environment contributing scenario(s):	
Use of Nickel salts in conversion coating	ERC 5

Environment contributing scenario:
The metal salts are dissolved in a water-borne application fluid, which is kept in a reservoir. It is pumped to dedicated machine(s) in order to be applied to the substrate or it is kept in a bath. With each piece of substrate a fraction of the application fluid is carried-over from the treatment bath. Via a sequence of rinsing steps this fraction of the application fluid is continuously emitted to the wastewater. Covers the use of metal salts in a broad range of specific applications, e.g. surface treatment, metal treatment, surface finishing, corrosion inhibition etc.. The treatment of the metal parts can occur by bathing or by spraying. Spray applications are enclosed.

9.1.1. Environmental contributing scenario 1: Use of Nickel salts in conversion coating

9.1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.05 tonnes/day The value represents an indicative worst case value for the substance use rate per site. The amount of metal salt used for the daily replenishment constitutes the substance use rate.
• Annual use at a site: <= 1E3 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Technical and organisational conditions and measures
• Type of Process: Water based process with negligible volatilization
• Indoor/outdoor use: Indoor Use
• Chemical waste - discontinuous generation: Spent reservoir fluid to be disposed of as chemical waste
• Chemical waste - continuous generation: Residues which cannot be recycled are disposed off as chemical waste.
• Process efficiency: Optimized water use due to e.g.: Re-use of rinsing water
• On site treatment of wastewater: pH-adjustment and subsequent filtration / sedimentation – Ni-salts (Wat: 95 %;)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes (Wat: 91.98 %;)
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: No
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

9.1.1.2. Releases

The local releases to the environment are reported in the following table.

Table 1. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification
Water	SPERC based AISE 5.1.v1 - AISE SPERC 5.1.a.v1 Industrial use of Me-salts in Conversion Coating – Nickel	**Initial release factor:** 100% **Final release factor:** 5% **Local release rate:** 2.5 kg/day **Explanation / Justification:** The spent process fluid consists of the rinsing, which contain the metal salts. As a first conservative approximation it assumed that the amount of metal salt is quantitatively lost from the process to the spent process water.
Air	SPERC based same as above	**Initial release factor:** 0% **Final release factor:** 0% **Local release rate:** 0 kg/day **Explanation / Justification:** Metal salts in aqueous solutions are involatile and are intended to remain in the application solution. Volatilization of metal salts is therefore negligible. Spray applications are housed-in. This prevents worker exposure and releases to air.
Soil	SPERC based same as above	**Final release factor:** 0% **Explanation / Justification:** Releases to soil do not occur during normal operation of the process.

Subsequent part of Chapters 9 and 10 of a Chesar-generated CSR detail the outcome of the exposure and risk assessment. These are not relevant for demonstrating how SPERCs will be documented in a Chesar-generated CSR. For that reason, these parts are not shown in this appendix.

Appendix 3b –Formulation & (re)packing of substances and mixtures – Industrial (Solvent-borne)

9.1. Exposure scenario 1 : Formulation

Environment contributing scenario(s):

Formulation ERC 2

Environment contributing scenario:
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, use of solvents during tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. Process optimized for highly efficient use of raw materials (very minimal environmental release).

No wastewater emissions from formulation as such, as process operates without water contact. Cleaning of equipment is carried out using solvents. Final cleaning step involves water, leading to wastewater emissions.

Negligible air emissions when process operates in a contained system. Otherwise volatile compounds subject to air emission controls.

9.1.1. Environmental contributing scenario 1: Formulation

9.1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 100 tonnes/day
• Annual use at a site: <= 2.5E3 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Technical and organisational conditions and measures
• Indoor/outdoor use: Indoor use
• Process efficiency: Process optimized for highly efficient use of raw materials
• Wastewater concernment: No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
• Air treatment technology: Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. wet scrubber – gas removal and/or air filtration – particle removal and/or thermal oxidation and/or vapour recovery – adsorption
• On site treatment of wastewater: Acclimated biological treatment (Wat: 70 %;)
• Additional on-site treatment of air: Not applied (Air: 0 %;)
• Further on-site technology: Not applied (Waste: 0 %)
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes (Wat: 97.15 %;)
• Discharge rate of STP: <= 2E3 m3/d
• Application of the STP sludge on agricultural soil: No
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

9.1.1.2. Releases

The local releases to the environment are reported in the following table.

Table 2. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification
Water	SPERC based ESVOC 2.2.v1 - VP 100-1000_WS<1 Formulation & (re)packing of substances and mixtures (industrial): solvent-borne - Solvent-borne	**Initial release factor:** 5E-4% **Final release factor:** 1.5E-4% **Local release rate:** 0.15 kg/day **Explanation / Justification:** Emission factors to wastewater are conservatively calculated based on wastewater volume generated from cleaning operations and substance aqueous solubility Assumption of 5 m3 of wastewater generated per 1 tonne of substance used is relatively conservative.6 Example: 1 mg/L x 5 m3/tonne use x 1000 L/m3 x 1tonne/109mg = 0.000005 tonnes/tonne used. For WS range (e.g., 1-10 mg/L), the geometric mean (i.e., 3.2 mg/L) is used to calculate the fraction released. OECD Coatings ESD4 reports no releases of volatile substances to water.
Air	SPERC based same as above	**Initial release factor:** 1% **Final release factor:** 1% **Local release rate:** 1E3 kg/day **Explanation / Justification:** Estimates on the basis of substance vapor pressure taken from EUTGD (2003) Appendix 13. These values are consistent with the range of emissions reported in OECD Coatings ESD4 and consistent with EU Solvent Emissions Directive after typical RMMs.
Soil	SPERC based same as above	**Final release factor:** 0.01% **Explanation / Justification:** ERC2 default

Subsequent part of Chapters 9 and 10 of the Chesar-generated CSR detail the outcome of the exposure and risk assessment. These are not relevant for demonstrating how SPERCs will be documented in a Chesar-generated CSR. For that reason, these parts are not shown in this appendix.

Appendix 4 – Environmental RMMs in the Cefic RMM Library.

Table 4. Default RMM efficiencies included in Cefic RMM library (Status: December 2009).

RMM Air		**RMM Water**	
Type	E_{RMM}	Type	E_{RMM}
Wet scrubber - for dusts	0.5	Sedimentation of solids	0.3
Wet scrubber - for gas removal	0.7	Air flotation	0.8
Waste gas membrane separation	0.9	Filtration	0.5
Separator	0.1	Oil-Water Separation	0.9
Dust collection - air cyclones	0.7	Chemical treatment - Wet Air Oxidation	0.5
Waste gas treatment - thermal oxidation	0.98	Adsorption	0.1
Waste gas treatment - catalytic oxidation	0.9	Ion Exchange	0.8
Waste gas treatment – adsorption	0.8	Thermal Treatment - Distillation / Rectification	0.9
Biological treatment - degradable substances	0.7	Biological treatment Anaerobic	0.75
Waste gas treatment – condensation	0.1	Biological treatment – Aerobic	0.76
		Central Biological Waste Water Treatment	0.97
		Biological treatment - Sludge treatment e.g. thermal sludge reduction	0.6

Appendix 5 - Experiences and Examples from the SPERC Development until mid 2011

The SPERC development is an activity driven by sector groups and trade associations. They followed different approaches to produce SPERCs which cover a wide range of applications. Table 1 provides an overview of the past SPERC development activities.

CEPE, the European Sector Group of the producers and users of paints, printing inks, industrial coatings and artists' colors used the emission factors of the OECD ESD "coatings industry" as starting point because manufacture and application of coatings are covered broadly. This information was evaluated by expert judgment leading to the conclusion that the data in the ESD is in some areas out-of-date. Therefore the technical requirements of the VOC Directive 99/13/EC were used to define a conservative "typical worst case" covering all installations being subject of this directive. Other types of installations remain uncovered by the SPERCs developed by CEPE.

Like CEPE, TEGEWA, the federation of the textile processing industry, found the OECD ESD for their industry as well. In response, measurements were performed in order to refine the release fractions for the textiles industry.

Table 1.Overview of SPERC development activities.

Developer[6]	Type of Information used	Applications covered	Focus of SPERC
CEPE	OECD ESD on Coatings and Paints, VOC Directive 99/13/EC	Formulation of coatings and inks, industrial applications	Refinement of ERC release fractions
FEICA	OECD ESD on Adhesives, on Coatings and Pains	Formulation of adhesives, industrial applications	Refinement of ERC release fractions
RIVM	OECD ESD for "Pulp, paper and board industry", BREF on Paper Industry	Industrial application of chemicals in paper making	Refinement / Validity of RMM efficiency
AISE	Georeferenced population density data, market research data	Wide dispersive application	Refinement of TGD default for amount of substance used at local level
Euro-metaux	Measured data from EU risk assessments	Manufacturing, formulation and industrial uses	Replacing ERC release fractions with measured emission data.
TEGEWA	OECD ESD on Textiles, measured data	Industrial applications of textile treatment chemicals	Refinement of ERC release fractions
ECHA	OECD ESD on Textiles	Industrial applications of textile treatment chemicals	Development of SPERC data model for CHESAR.

The Dutch National Institute for Public Health and the Environment (RIVM) developed an example SPERC for paper making by using the OECD ESD for "Pulp, paper and board

[6]For explanation of abbreviations, please see the following sections

industry" as a starting point. The ESD was found to provide insufficiently detailed information and the BREF document for the paper industry was consulted. It provided information on sector specific RMMs. Their efficiency was estimated using the input of sector experts. RIVM found it necessary to make the SPERC specific for the type of chemical used and devised sub-SPERCs for the three main chemical groups.

FEICA, the federation of adhesive and sealant manufacturers, judged the ESD on Adhesives inappropriate since it is not based on empirical data. Instead the OECD ESD for Coatings was used as starting point to develop SPERCs for adhesives. FEICA argued that the conditions of adhesive and sealant application and use are similar to coatings and thus that the emissions can be read across. In addition, FEICA found the applications to be too specific. Hence, individual applications were aggregated to define broader application types and worst case release factors were assigned.

The International Association for Soaps, Detergents and Maintenance Products (A.I.S.E.) used another approach for developing a SPERC factsheet for wide dispersive use of cleaning products, 100% of which are released to the municipal wastewater. The focus was on replacing the default value of 0.2% of a substance being used in unit town according to the ECHA Guidance Document R.16 by a realistic estimate. To that end market survey data, geographically resolved population density data and environmental monitoring data were employed to arrive at an estimated value of 0.075%.

The European Association of Metals (Eurometaux) used measured emission data, which integrate all on-site processes per life cycle stage including risk management measures. The 90^{th} percentiles were established as realistic worst-case rates of substance release to the environment. Hence, the resulting release factors do not hinge on assumptions. As a result they are generally more realistic.

Width of Scope / Level of Detail

The SPERC factsheets may differ considerably in the degree of detail by which operational conditions, risk management measures, and good practice are described and by the information underlying it. It is consensus that a minimum level of detail of information needs to be provided in each SPERC factsheet. Differentiation in structure / coverage of a SPERC and in the detail of information presented in a factsheet beyond this minimum level may be decided case by case depending on the specific need in a given sector and its processes. If substances are more hazardous and/or are used in higher tonnage and/or higher release factors apply a higher level of detail may be necessary, more refined SPERCs may cover more specific installations or processes.

In each sector of industry there is a diversity of processes/activities and a diversity of practices in operating these processes. Defining the appropriate number of SPERCs need to strike the balance between i) standardization and efficient communication in the supply chain on the one hand and ii) a sufficient level of differentiation in order to avoid too conservative exposure estimation (for covering all high end emissions) or too high level of process techniques and risk management (only reflecting the high end of best practice).

It is clear that, in order to be practical, a SPERC need to be defined such that they cover the majority of sites. It was consensus that industry sectors should start SPERC-development with core processes of the sector, and carefully balance the decision between simplicity and detail.