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Guidance for developing and documenting specific ERCs

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Scope

SPERCs constitute emission assessments and may serve to refine the emissions estimates provided by the Environmental Release Classes or the REACH TGD. This document provides guidance on the development specific Environmental Release Classes (SPERCs). It outlines which information is required for developing a SPERC and how it needs to be documented such that the SPERC emission estimates are transparent to the assessors. The document includes examples that may illustrate how SPERCs can be developed.

Guidance for developing and documenting specific ERCs

Background for developing specific ERCs

Emission scenarios are employed to describe the relationship between quantities used and emitted. In the REACH Guidance on IR CSA ERCs are introduced 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. In combination with an amount used per ERC, a generic emission estimate can be derived. Owing to their nature as tier-1 scenarios, they are simple and provide conservative emission estimates.

The IR CSA guidance generally acknowledges that an ‘ERC should be used as a starting point for emission estimation’. The IR CSA guidance explicitly encourages the use of more refined or specific information for emissions from industrial sources. Describing the typical use of substances in a sector may lead to emission estimations which are typical for a sector. Such emission estimations are a first refinement of the ERCs. They can be refined further by site-specific emission estimates (taking into account specific risk management measures, amounts used, river discharge rates etc) or by measured emission data.

Specific ERC Development – Multistep-Process

This section outlines the general process via which SpERCs can be obtained. It is intended as guidance for the development of SpERCs. In theory, sector SpERCs encompass emission relevant information for all life-cycle stages and are based on sector specific knowledge. Where possible they should capture information on use rates, emission fractions, and risk management measures (including their efficiency). In that manner, SpERCs represent typical emission situations for applications/ processes for sector specific uses of substances. The development of SpERCs encompasses the collection and evaluation of information, evaluation to yield realistic and validated SpERCs.

Sector organisations and specific ERCs

Sector organisations may play a central role in constructing such typical emission scenarios. Via their members they may collect and evaluate the information. Applying judgement based on the application knowledge in the sector, they define typical values of substance use rates, emission fractions, and risk management measures. In that manner, the sector organisations apply a form of peer review and thus warrant that the SpERC are based on reliable information. The judgements made in the development of the SpERCs may become part of the documentation of the SpERCs.

Developing SpERCs in five steps:

1 Definition of scope

First, the scope of the emission estimation needs to be defined. This involves clarifying which processes and/or application types need to be described. As a result, the applicability domain of a SpERC is clearly defined and can be communicated in the supply chain. In order to warrant consistency, a link should be made to the ERC which is pertinent to the SpERC under development (See Annex 2 for the A.I.S.E. examples for technical cleaning. fication). All these SpERCs for the industrial use of cleaning and maintenance products are based on the ERC Industrial use of processing aids (ERC 4).

2 Information

SpERCs require information reflecting e.g. typical emission fractions, risk management measures which are implemented in a typical operation and typical product use rates. Such information can be obtained from OECD ESDs, in-house application knowledge, or information gathered via customer queries. Emission fractions need to be developed. Where available they may be based on measured emitted amounts. Alternatively, the application knowledge may be used to develop approximations of the emission fractions. Measures for managing environmental risks generally reduce emissions. Hence, SpERCs need to specify the type of risk management measure and its respective efficiency. The efficiency may be inferred e.g. from measurements, or by specific knowledge in the sector. As implemented so far, RMM are a key element. They are listed in the release sheets of the ECETOC TRA ENV tool.

3 Evaluation and processing

SpERCs are a refinement to the conservative ERCs and represent typical sector specific emission scenarios. The information obtained in the collection process should be evaluated with regard to what extent the collected information represents typical emission situations. This evaluation may encompass the definition of typical values for e.g. emission fractions, risk management efficiency, or product use rates. Among others, professional judgment or statistical evaluation may be applied in the evaluation process. Developing SpERCs in a sector organisation can be viewed as a peer-review process to ensure that SpERCs reflect the relevant knowledge available in the sector.

4 Documentation of SpERCs

The Regulatory acceptance of SpERCs hinges on the reliability and transparency of the information used in their creation. Consequently, it should be possible to grasp from a single document to what extent a SpERC differs for the ERC given in the IR CSA guidance, what input information was employed and how this information was processed in their construction. Annex 2 shows for a selection of SpERCs how the information underlying the emission assessment can be tabulated. The evaluation process for each SpERC may be documented in a separate factsheet. Two draft examples of which are shown in Tables Y1 and Y2.

5 Availability of SpERCs

Currently, few SpERCs have been constructed and reside with the sector organisations. In the future, they should be available for the generation of REACH Exposure Scenarios. To that end, it is desirable that they be deposited in a central database. At present, such a database does not exist. However, it may be developed as part of the exposure scenario libraries of the CSA/CSR IT-tool or as part of the

Generic Exposure Scenario libraries. A systematic naming of SpERCs is desirable to facilitate electronic searches and, hence, a prerequisite for rendering them available in the yet to be developed Exposure Scenario library.

SpERC documentation - 'Industrial use of water-based adhesives'

Table Y1: Draft example of a SpERC factsheet for 'Industrial use of water-based adhesives'

	Characteristics of specific ERC	**Type of Input Information**	**Processing of Input Information**
Title of specific ERC	Industrial use of water-based adhesives		
Based on ERC	5 – Industrial use resulting in inclusion into or onto matrix		
Scope	All industrial uses of water based adhesives		
Product use rates	A maximum safe use rate of a substance can be specified as the outcome of an environmental assessment using the parameter set defined in the present SPERC and the environmentally relevant properties of the substance under assessment.	Arbitrary Assignment	Consensus in sector
Emission fraction	0% to air 0,2 % to water	Application knowledge	Consensus in sector
Type of RMM	None		
Efficiency of RMM	Not relevant		
Narrative description / Justification of specific ERC	Description: Water based adhesives are applied to solid substrates. Their function is to join the substrates. Hence the constituent substances remain in place, except for water, which is to evaporate. Justification: In the adhesive application, adhesive is purposefully placed onto a substrate. The adhesive is intended to stay in place. Hence, during the application process as such no adhesive is emitted to the environment. Residues formed during curing form solid residues which are disposed of as solid waste such that no emissions occur. For economic reasons the fraction of the adhesive remaining in containers and tubing of the application equipment is kept to a minimum. Equipment cleaning operations may involve water, in which case emissions to the water may occur. Specific knowledge in the sector was used to set a default worst case percentage of 0.2% of the sealant/adhesive to be emitted to the wastewater via cleaning operations.		

SpERC documentation – ‘Metal treatment / coating’

Table Y2: Draft example of a SpERC factsheet for `Metal treatment / coating’

	Characteristics of specific ERC	**Type of Input Information**	**Processing of Input Information**
Title of specific ERC	Industrial use in ‘Metal treatment / coating’ operations		
Based on ERC	5 – Industrial use of processing aid		
Scope	Industrial uses in ‘Metal treatment / coating’ operations		
Product use rates	A maximum safe use rate of a substance can be specified as the outcome of an environmental assessment using the parameter set defined in the present SPERC and the environmentally relevant properties of the substance under assessment.		
Emission fraction	0% to air [2] 100 % to water [2]	Generally accepted knowledge.	Consensus in sector
Type of RMM	Flocculation		
Efficiency of RMM	99% for metal cations 30% for other substances	Measurements Default value from Det. Reg.	Estimate based on measured data None
Narrative description / Justification of specific ERC	1: In ‘Metal treatment / coating’ operations metal parts are immersed in water baths, which contain etching, cleaning, coating products. These products are solutions of substances in water. The default concentration of a substance is 2%. The typical application solution contains the product at a concentration of 5%. With each metal part, a small quantity of bath solution is carried-over from the treatment bath, and via a cascade of rinsing steps emitted to the wastewater. Replenishing the bath solution needs on average 5m^3 water per day. As a result, the substance emissions are calculated as (20g Substance/ 1 Liter Product) × (50 Liter Product / 1 m^3 Application solution) × (5m^3 Application solution /d) = 5kg/d. 2: Justification: Metal treatment coating processes are carried out in enclosed equipment, hence aerosols that might be formed in high energy processes cannot escape to the ambient air. The water baths are operated at temperatures below 40°C. The process chemicals used in these process are non-volatile and cannot evaporate. Hence, emissions to air can be neglected. With each metal part a small quantity of bath solution is carried-over from the treatment bath, and via a cascade of rinsing steps emitted to the wastewater. Hence, it can be assumed that the substances in the treatment bath are quantitatively emitted to the wastewater.		

Example: SpERCs for manufacturing of solvent borne coatings:streamlining of OECD emission factors and testing vs default factors

	Characteristics of specific ERC	Type of Input Information	Processing of Input Information
Title of specific ERC	Manufacture of organic solvent borne coatings and inks		
Based on ERC	2 (Formulation of preparations)		
Scope	Formulation of organic solvent borne coatings and inks		
Use rates	A maximum safe use rate of a substance can be specified as the outcome of an environmental assessment using the parameter set defined in the present SPERC and the environmentally relevant properties of the substance under assessment.		
Emission fractions	1. To air: *VOCs:* - maximum 5% to air (< 1000t/a solvent) - maximum 3% to air (> 1000 t/a solvent) *Particulates:* 0.005% to air	Draft OECD Emission Scenario Document 'EMISSION SCENARIO DOCUMENT ON COATINGS INDUSTRY (PAINTS, LACQUERS AND VARNISHES)', June 2006	Reviewed and adopted from OECD ESD
	2. To wastewater/sewer/watercourses: 0 % liquids and solids		
	3. To soil: 0% liquids and solids		
Type of RMM	**VOC controls** RMMs primarily are aimed at controlling emissions of VOCs at source, rather than at "end of pipe" to meet the relevant total emission limit value set out in section 17, Annex IIA,1999/45/EC (SED). A wide range of RMMs are used to minimise emissions to atmosphere: - use of closed storage facilities (e.g. bulk storage tanks, IBCs, drums) for VOC-containing raw materials - use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) - use of closed production equipment, with no extraction, except when opening vessels for additions/sampling etc - use of semi-closed production vessels with extraction to atmosphere to maintain workplace airborne VOC concentrations below respective OELs - use of impermeable covers on work in progress - use of closed filling equipment - use of closed equipment cleaning and use of non-organic solvent based cleaning fluids. - storage of finished products in closed containers (bulk tanks, IBCs, drums, cans etc) - recycling and reuse of overmake product in subsequent batches		

	Characteristics of specific ERC	Type of Input Information	Processing of Input Information
	- storage of all VOC-containing wastes in closed, secure containers (bulk tanks, IBCs, drums) **Particulates** RMMs are primarily aimed at controlling emissions of particulates at the most significant emission points to atmosphere from sources within the manufacturing process where airborne particulates can be created. Typically: - particulate raw materials are delivered in bulk tankers and discharged to closed silos - particulate raw materials are delivered in closed packaging (IBCs, drums, boxes, sacks) - closed transfers of particulates from storage to production equipment (e.g. metered piped or pumped additions) is used - no extraction is used on closed production equipment, when adding and incorporating particulate raw materials - use of semi-closed production vessels with extraction to atmosphere are used to maintain workplace airborne particulate concentrations below respective OELs - cyclone and bag filters, connected to (often multiple) emission sources, are used to control emissions from manufacturing plant - particulate wastes are stored in closed containers.		
Efficiency of RMMs	**VOC RMMs** As the SED VOC emission controls are focused on controlling global emissions from the manufacturing plant, the performance of individual RMMs is not relevant – the overall efficiency of the total manufacturing process (process steps + RMMs) is a minimum either 95% or 98%. **Particulate RMMs** Bag and cyclone filters are typically rated at 99% efficient.		
Narrative description of/ justification for specific ERC	**Description:** The manufacture of solvent-borne coatings and inks is a multi-stage batch process. The process is arranged to maximise the efficiency of use of input raw materials, through the highest conversion into formulated products. Process losses are reduced to the absolute minimum, through use of general and manufacturing plant extraction to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered manufacturing equipment to minimise evaporative losses of VOCs. The composition of products and the overall process are such that there are no discharges of raw materials or products to waste-water or to soil from the manufacturing plant. **Justification**: The overall high efficiency of the coatings and inks manufacturing process is reflected in the low emission factors identified in independent assessment carried out by the UK's Environment Protection Agency, as part of the development of an Emission Scenarios Document for the OECD.		