ESCom XML 2.0 Guidance Document

Contents

About this guidance

Objectives of this guidance

This guidance is to ensure that REACH Exposure Scenario information can be seamlessly transferred from the IT-system of a supplier of a chemical product (substance or mixture) to the IT-system of a recipient. In that manner manual retyping of this information at the recipient end can be avoided. In the case of Exposure Scenario information relating to standard tier 1 chemical safety assessments, the standardized transfer of this information is to warrant that the information can be processed in a (partly) automated manner.

The ESCom XML has been devised as an industry standard such that the exchange of Exposure Scenario information is standardized. However, standardization also requires that the information from the chemical product supplier is provided in the right field in the ESCom XML. This guidance describes the rules according to which the interface between the supplier's IT system and the ESCom XML should fill the ESCom XML with information.

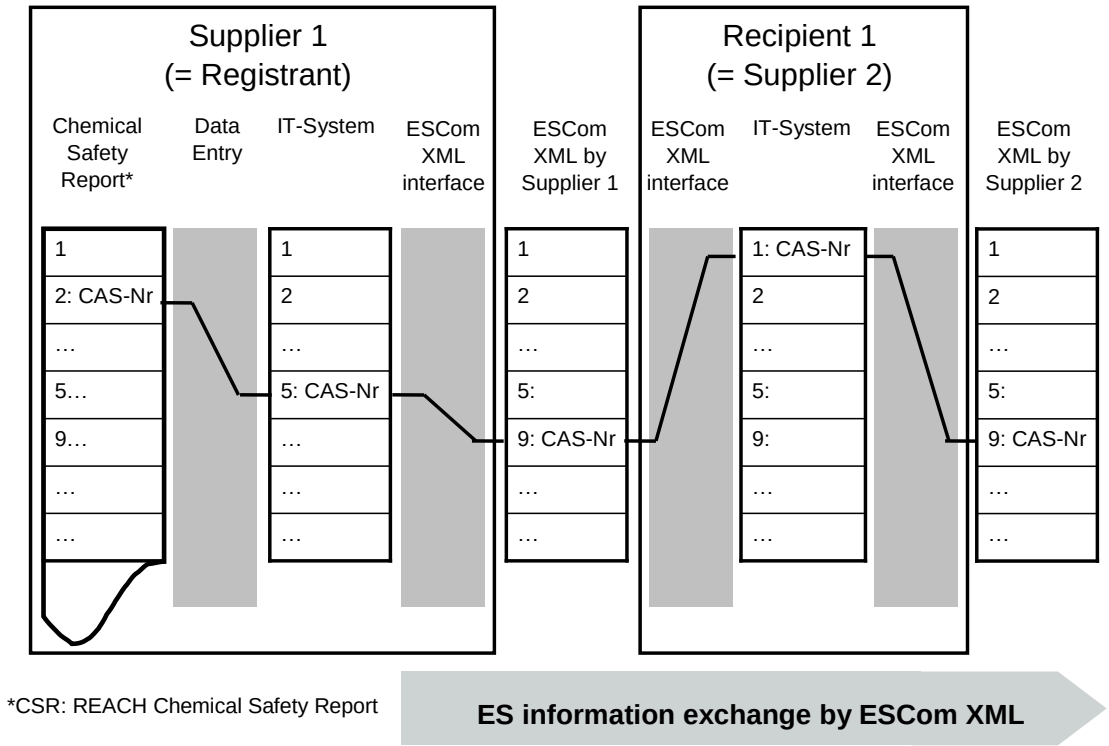

Figure 1. Schematic representation of the electronic communication of Exposure Scenario information through ESCom XML.

Figure 1 provides a schematic representation of the electronic communication of Exposure Scenario information through ESCom XML from the suppliers' IT system to that of his customer (here referred to as recipient). The communication process requires that:

1) the supplier enters the Exposure Scenario information into the supplier's IT system
2) the supplier's IT interface transfers the information to the ESCom XML
3) the customer's IT interface transfers the information into the customer's IT system

If the customer is a formulator, he will again use his interface to transfer Exposure Information on his product to his customer.

Where can I obtain the ESComXML standard

The standard can be downloaded from the Cefic website at http://www.cefic.org/Industry-support/Implementing-reach/escom/ . The standard will be provided for free under a so called 'open license agreement', which requires registering, before the download can take place. The registration process requires personal details to be provided, in order to have addressing information for future communication regarding the ESComXML (and ESComPhrase) standard.

How can I check if my ES is compliant with the ESComXML standard?

In order to validate whether an ES for Communication XML file complies with the standard, a few examples will be provided that can be used for creation of the ES. After creation of the ES, based on the input examples, the results can be compared with the example XML output file.
These examples will be provided via the Cefic website.Appendix V of this document contains an example.

Audience of this guidance

As a result of describing the functioning of this interface, this guidance addresses suppliers of chemical products (substances and mixtures) and software companies, which deliver IT-support for supply chain communication. It informs suppliers of chemical products (substances and mixtures) about the standardized representation of Exposure Scenario information in terms of phrases, numerical values, and units and how to maintain this information in their IT-systems. The software companies are provided with the information needed to set up the interfaces such that the data fields of the ESCom XML are appropriately matched to the data fields of the IT-systems of the suppliers and recipients.

What is covered by this guidance

This guidance describes the information content of ESCom XML version 2.0. Its primary purpose is to provide guidance on which information on an Exposure Scenario has to go into which field in the ESCom XML version 2.0, and how it has changed from the previous versions. To that end, different information types are distinguished, to indicate from where the information originates. Emphasis is put on the information required to have a complete set of information for communicating an ES as a result of an ECETOC TRA tier 1 assessment.

The Chapter 'Handling the ESCom XML package and navigating through it' provides guidance on the practical aspects of opening and navigating the ESCom XML package.

The Chapter ‘How to read the graphical representations’ introduces the reader to the graphical representations, which provide an overview of the ESCom XML.

In the Chapter ‘Overview of all Attributes’ each data field of the ESCom XML is presented in its relation to other data fields. In addition, specifications are given for each field of ESCom XML whether it is essential to fill this field, what type of information the field contains, what data type is used to represent the information (for instance a phrase, numerical values, etc.). In case of data fields which are labeled essential, examples of how a data field can be filled are given. In case of phrases, multiple phrases may be given by way of example. However, the lists of phrases are not intended to be comprehensive.

What is not covered

ESCom XML rel. 2.0 has to be viewed as a container for information. ESCom XML rel. 2.0 does not make any presumptions on how the information has been selected, or processed by the originator of the data or its quality.

The authors of this guidance on ESCom XML are convinced that ESCom XML can also convey a major fraction of the information required for higher tier assessments. However, this has not yet been evaluated systematically and therefore will not be addressed in this guidance.
This document does not provide guidance on how Exposure Scenario information is presented in a Chemical Safety Report or in the printed version of the Annex of a safety data sheet. The issues of information requirements and organizing the Exposure Scenario information for the Chemical Safety report has been addressed in the ECHA guidance documents:
http://echa.europa.eu/guidance-documents/guidance-on-information-requirements-and-chemical-safety-assessment

And illustrative examples:
http://echa.europa.eu/web/guest/support/practical-examples-of-exposure-scenarios
http://echa.europa.eu/support/practical-examples-of-chemical-safety-reports

Status of the guidance

It is based on a thorough understanding of tier-1 assessment information and based on the experiences made in a selected number of mapping exercises in which the information from real-life exposure scenarios was assigned to the data fields of the ESCom XML. However, testing of the guidance in a real-life environment could not yet be performed. As a result, the guidance will undergo further development once feedback becomes available, first as a result of additional mapping exercises and later supported with real-life experience.

How the information is presented

This guidance is subdivided in seven chapters. The Introduction to ESCom XML version 2.0 provides information on the objectives for standardized communication of Exposure Scenario information using the ESCom XML. In the subsequent chapter ‘ESCom Phrases’ background information on the Exposure Scenario phrases and the use of phrases in conjunction with ESCom XML is given. The chapter ‘Information in ESCom

XML' informs about the information content, which is transported by the ESCom XML and how it has been structured for the sake of this guidance.

Detailed information is provided in the appendices. Appendix I provides instruction on how to handle and navigate the ESCom XML schema definition. Appendix II ('How to understand the ESCom XML definition') explains the meaning of the ESCom XML schema definition. The data types used the ESCom XML schema are detailed in Appendix III. Appendix IV (Overview of all attributes) contains all the detailed information on the ESCom XML. It provides the definition of the ESCom XML data model along with guidance information. This overview of all attributes shows screen shots of all boxes of the ESCom XML schema definition. Each screen shot is followed by a table which addresses the individual attributes along with guidance information on whether the attribute is essential and what ESCom XML information type it represents. Appendix V presents an example of the content of a real-life Exposure Scenario being mapped to the ESCom XML fields.

Introduction to ESCom XML version 2.0

ESCom XML – Standardizing communication of Exposure Scenarios

Exposure Scenarios are a new element in supply chain communication for hazardous substances registered under REACH (in excess of 10 tonnes per annum per registrant). Exposure scenarios define the conditions of safe use of substances. They are generated as part of the chemical safety assessment and documented in the Chemical Safety Report, which is submitted as part of the REACH registration dossier. REACH foresees that the Exposure Scenario information is communicated from supplier to customer. This requires that large amounts of information be communicated in the so-called extended safety data sheet. The annex of the extended safety data sheet is dedicated to convey this information. In addition, this information may be communicated on a voluntary basis electronically. ESCom XML version 2.0 has been developed as an electronic exchange format to avoid manual retyping of this information and to facilitate partly automated processing of the information in the supply chain.

The benefits of the ESCom XML are as follows:
With ESCom XML the recipient of the Annex:

- does not have to retype the Exposure Scenario information of the printed Annex.
- does not need to read and understand/interpret the printed Annex in order to be able to retype the Exposure Scenario information of the printed Annex.

By eliminating the need for interpretation ESCom XML

- Reduces the chances for human errors due to the retyping in the supply chain
- Increases the consistency in supply chain communication.

Automation Benefits

Automation benefits are possible if standardized communication is followed. Standardized communication means to use a standardized container to transport the information from one actor in the supply-chain to his downstream users. The ESCom XML represents the standardized vessel. In addition, the information content needs to be standardized as well. Therefore, standardized phrases are a complementary element in the standardized communication.

ESCom XML and Standardized Content

Standardized communication requires use of standardized content. To that end, various data types and almost 200 data fields have been defined in order to transport the content in ESCom XML. In addition, the dependencies of the data have been defined and data have been grouped. This together constitutes the ESCom XML data model. This data model is presented in detail in this guidance.

ESCom Phrases

Standard phrases are needed to exchange the information in the REACH exposure scenarios (ESs) for communication along the supply chain in a harmonized way. Their use helps to ensure quality, consistency and clarity in the information exchanged between suppliers of substances and their customers. Cefic and several other sector associations, as well as sector groups and assessment tool owners, have developed a catalogue of standard phrases in order to provide all those involved in the supply chain with standardized phrases that can support the exchange of information. These phrases are published as ESCom phrases, in an Excel file which is available from the Cefic website (http://www.cefic.org/Industry-support/Implementing-reach/escom/). Phrases can be clearly referred to, browsed and retrieved by using the unique phrase identifier xxx/xxxxx etc. which are assigned to them when they are included in the catalogue, and the phrase metadata. This phrase identifier is based on EuPhraC codes.

General Rule

- The use of standard phrases is a prerequisite for the automated processing of exposure scenario information in the supply chain. The use of non-standard phrases should be kept to an absolute minimum.

Rationale

- Deviating from this general rule violates the principle of standardization. The ESCom XML schema definition is one element of this standardization. Only if combined with the ES standard phrases for communication will the ESCom XML bring the needed efficiency gains for the supply chain.

What should be done if "European level" standard phrases do not fit the needs of a company?

Suitable phrases:

- The company should first evaluate whether the phrases that are considered as missing are not yet included in the catalogue because they are not in line with the general set of rules for building “good” standard phrases. The rules on what is relevant for communication and how certain pieces of information should be structured to provide clear and relevant instructions to the recipient of the ES have been developed by an expert working group covering the entire supply chain. The explanation on why specific types of phrases have been intentionally excluded from the list of standardized ones may be addressed in the guidance to build phrases . The guidance document can be found at http://www.esdscom.eu/app/download/5706779216/Euphrac%20phrase%20guidance%20final%2020.03.2014.pdf?t=1405426623 More information about the

process of managing phrases can be found at http://www.esdscom.eu/english/euphrac-phrases/ If, after this check, the company considers that the Catalogue does not contain a suitable phase, then the following steps are recommended:

Sector organization phrases:

- The company should first explore whether its sector organization has produced suitable phrases agreed at sector level. The Catalogue contains a number of phrases that have been provided by, or are derived from, sector organizations. Wherever possible, the sector route should be used for the development of new, additional phrases.

Company phrases

- Only when the sector route is not a practical proposition is it possible to express the information content in a company-specific phrase..

Company phrases – Follow up:

In case a company considers that its company-specific phrase is of general relevance, the phrase can be submitted to the Standard Phrase review process. The submitted phrase will then be evaluated against the rules/criteria for selecting new phrases by the ESCom Standard Phrase Working Group for inclusion in the catalogue of standard phrases. In the case of a positive evaluation, the new phrase will be added to the catalogue of standard phrases. The procedure applied in the evaluation of new phrases proposed via this tool can be consulted here: http://content.euphrac.eu/

***Note**:*

- *'Remarks' and 'Free text' can be considered as text strings of Standard and/or non-standard Phrases.*
- *'ESCom XML will only contain Phrase codes (no Phrase text), except for Company specific phrases*

Co-existence of multiple Phrase catalogues

EuPhraC codes are the master codes for ES standard phrases in order to create ESCom XML compliant exposure scenarios for communication. In practice, other proprietary Phrase Catalogues do exist. Such Catalogues will utilize different coding schemes which are used / integrated in various company EHS-related systems.

Ideally, a revision of non-ESCom phrases should take place with time so that all relevant phrases become included in the ESCom catalogue. Exceptions may be (i) those phrases that are very specific for the communication of a company-specific requirements and (ii) those phrases that are included in the ES but not for the communication of safe use information but rather to support business-related information exchange between a supplier and the recipient of the ES.

For the time being, in order to create ESCom XML compliant exposure scenarios, rules are needed to define how to deal with a multiple catalogue situation.
The following rules apply:

- If an ES is meant to be compatible with the ESCom XML standard, then ALL Phrases in the ES have been identified by a **EuPhraC** Phrase ID.

The Phrase Catalogue ID will be defined in the PhraseCatalogID node with a value of ESCom. The Catalogue version which has been used to produce the file will be defined in the PhraseCatalogVersion node. The current EuPhraC catalogue version number as of the writing of this document is version 1.5.

- Each Phrase in the ESCom XML has 2 placeholders for a Phrase code:
  - A 'EuPhraC Phrase ID'
  - A 'Phrase ID' referring to a Phrase in a proprietary Phrase catalogue
- The proprietary Phrase ID may be entered

How to find Phrases for the generation of an exposure scenario.

The current version of the ESCom phrase catalogue contains approximately 2000 phrases, from which selections have to be made during the creation of an exposure scenario. In order to have a more focused filtering / selection of phrases, metadata can be used to narrow down the number of phrases from which to select In fact, a set of so-called *Catalogue metadata* is assigned to each phrase. This aims at clarifying for the user, among other things, where a certain phrase is expected to be used/placed/found in the ES, which type of format it should have, e.g. if a value is expected to complete its meaning, and the relevant target to which the phrase applies. A full explanation of the possible catalogue metadata assignments and their meanings can be found in the Phrase Catalogue available here: http://www.esdscom.eu/english/euphrac-phrases/.
Starting from Version 2.0 of the Catalogue, together with this set of so-called *Catalogue metadata,* which is useful for manual filtering and consultation of the catalogue, another additional element is included, the so-called XML metadata. This additional element specifies the mapping to a field or attribute in the ESCom XML and links each phrase to the XML field where the phrase is relevant. This helps to ease the IT (electronic) exchange and processing of the information, thereby avoiding incorrect manual assignments, and leads ultimately to an increased accuracy and harmonization of the ES generated.

Translations

The EuPhraC catalogue phrases are currently available in English and some phrases are also available in German. Translations of the phrases into other languages is outside of the scope of this project.

Information in ESCom XML

ESCom XML Information Types

For a better understanding of the ESCom XML, each of the data fields of ESCom XML has been classified with regard to which information the data field transports. This classification is not part of the ESCom XML as such but part of this guidance.

This table provides an overview of the information types in the ESCom XML:

Info Type XML Name	Description
NumericIntervalWithQualifier	Specifies a numeric interval with qualifier e.g.

	'<'. The numeric values (lower and upper limit value) are patterned according to the IEEE single-precision 64-bit floating point type.
NumericIntervalWithUnitAndQualifier	Specifies a numeric interval with unit and qualifier e.g. '<'. The numeric values (lower and upper limit value) are patterned according to the IEEE single-precision 64-bit floating point type.
NumericValueWithQualifier	Specifies a numeric value with qualifier. The numeric value is patterned according to the IEEE single-precision 64-bit floating point type.
NumericValueWithUnit	Specifies a numeric value with unit and qualifier e.g. '<'. The numeric value is patterned according to the IEEE single-precision 64-bit floating point type.
NumericValueWithUnitAndQualifier	Specifies a numeric value with unit and qualifier e.g. '<'. The numeric value is patterned according to the IEEE single-precision 64-bit floating point type.
Phrase	Describes a phrase represented by a phrase identifier. The phrase identifier must be part of the PhraseCatalogID and specific PhraseCatalogVersion values contained in the header of the document.
SubstanceIdentifier	Identifies a substance, consists of a number of attributes that uniquely identify a substance

Defining the types of information

An ESCom XML document contains a series of building blocks. The building blocks may appear just once or may be repeated multiple times based on the specific definition of that building block in the overall XML Schema.

The following table outlines the building blocks used in every ESCom XML document

Name	Rules for usage in document	Description
ESCOMXML_TOP	Must appear only once	Administrative and descriptive information about the creator of the

		document and the phrase catalogue used to create it.
Object	Must appear only once	Container for other building blocks
ExposureScenario	May appear zero or more times	Specific description of a particular ES, including Short Title, Sector of Use, Product Category, etc.
Substancce	Must appear one or more times	Industry identifiers for the substance
DNEL_DMEL	May appear zero or more times	
PNEC	May appear zero or more times	
LeadPrioritySubstance	May appear zero or one times	
M-Factor	May appear zero or one times	
SpecificConcentrationLimit	May appear zero or more times	
ContributingScenarioEnvironment	Must appear one or more times for each ExposureScenario	
ContributingScenarioWorker	May appear zero or more times for each ExposureScenario	
ContributingScenarioConsumer	May appear zero or more times for each ExposureScenario	
GuidanceToDU	May appear zero or one times for each ContributingScenario* type	
AmountsUsed	Must appear one or more times for each ContributingScenario* type	
Characteristics	May appear zero or more times for each ContributingScenario* type	
FurtherOperationalConditions	May appear zero or more times for each ContributingScenario* type	
ConditionsOfUse	May appear zero or one times for each ContributingScenario* type	
Msafe	May appear zero or more times for each ContributingScenarioEnvironment	
ReleaseEstimation	Must appear one or more times for each ContributingScenarioEnvironment	

FrequencyDurationEnvironment	May appear zero or more times for each ContributingScenarioEnvironment	
Environmental Factors	Must appear one or more times for each ContributingScenarioEnvironment	
MunicipalSTPConditions	Must appear one or more times for each ContributingScenarioEnvironment	
TargetRouteENV	May appear zero or more times for each ContributingScenarioEnvironment	
RiskManagementMeasuresEnvironment	May appear zero or more times for each ContributingScenarioEnvironment	
ExternalRecoveryOfWaste	May appear zero or more times for each RiskManagementMeasuresEnvironment	
WasteRElatedMeasures	May appear zero or more times for each RiskManagementMeasuresEnvironment	
ReleaseDischargePrevention	May appear zero or more times for each RiskManagementMeasuresEnvironment	
ExposureLevel	Must appear only once per TargetRouteENV	
FrequencyDurationWorkerConsumer	May appear zero or more times for each ContributingScenarioWorker or ContributingScenarioConsumer	
OtherGivenOperationalConditions	May appear zero or more times for each ContributingScenarioWorker or ContributingScenarioConsumer	
TargetRouteHH	May appear zero or more times for each ContributingScenarioWorker, ContributingScenarioConsumer or ExposureLevel	
RiskManagementMeasureWorkerTechnical	May appear zero or more times for each ContributingScenarioWorker	
RiskManagementMeasureWorkerOrganizational	May appear zero or more times for each ContributingScenarioWorker	
RiskManagementMeasureWorkerPersonal	May appear zero or more times for each ContributingScenarioWorker	
RiskManagementMeasureConsumer	May appear zero or more times for each ContributingScenarioConsumer	
RiskManagementMeasure	Underlying Complex Type for implementation of other RMM types	

References to ESCom documentation

Below list provides an overview of documents / files which are available regarding the ESCom standard:

ESComXML:
- ESComXML Guidance document
- ESComXML Data Model
- ESComXML Example

ESComPhrase:
- ES Standard Phrase catalogue (Excel file)
- ES Phrase data / metadata submission template
- User Guidance

Special Note:

Appendicies I through IV have been removed from tyhis document and were combined into a separate Technical Guidance document that accompanies this document.

Appendix V – Example Exposure Scenario – mapped to ESCom XML fields

Annex: Exposure Scenarios

1. Short title of exposure scenario

Use as Monomer
SU3; SU12; ERC6c; PROC 1, PROC2, PROC 3, PROC 4, PROC8a, PROC8b, PROC15; PC32

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC6c: Industrial use of monomers for manufacture of thermoplastics
Operational conditions	
Daily amount per site	50,000 kg
Minimum emission days per year Continuous	300
Emission factor air	0.10 %
Emission factor water	1.00 %
Emission factor soil	0.00 %
Receive Surf. Water (Flow Rate).	400,000 m3/d
Dilution factor river	201
Dilution factor coast	100
Other Factors: Environment	Indoor and outdoor use.

Risk Management Measures	
Type of STP	onsite STP
Estimated subst. removal from wastewater via sewage treatm. (%)	91.5 %
Total effic. of removal from wastewater after RMMs and STP(%)	91.5 %
Assumed sewage treatment plant flow (m3/d)	2,000 m3/d
Exposure estimate and reference to its source	
Risk Characterization Ratio (RCR)	0.287
	Risk from environmental exposure is driven by freshwater.

Contributing exposure scenario	
Use descriptors covered	PROC 1: Use in closed process, no likelihood of exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	hexamethylenediamine Content: >= 0 % - <= 100 %
Physical state	Liquid, moderate fugacity
Vapour pressure of the substance during use	48 hPa
Process temperature	110 °C
Duration and Frequency of activity	480 min 5 days per week

Indoor/Outdoor	Indoor, Outdoor
Exposure estimate and reference to its source	
Assessment method	ECETOC TRA v2.0 Worker
	Worker - inhalative, long-term - local
Exposure estimate	0.01 mg/m³
Risk Characterization Ratio (RCR)	0.02
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation) Use domain: industrial
Operational conditions	
Concentration of the substance	hexamethylenediamine Content: >= 0 % - <= 100 %
Physical state	Liquid, moderate fugacity
Vapour pressure of the substance during use	48 hPa
Process temperature	110 °C
Duration and Frequency of activity	420 min 5 days per week
Indoor/Outdoor	Indoor
Room size	3,000 m3
Ventilation rate per hour	3
Open surface	0.1 m²
Risk Management Measures	
Ensure minimization of manual phases Regular inspection and maintenance of equipment and machines. Clean equipment and the work area every day. Avoid frequent and direct contact with substance. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
Ensure containment of the emission source	Effectiveness: 99 %
Use suitable eye protection. Use suitable chemically resistant gloves.	
Risk Management Measures are based on qualitative risk characterisation.	
Exposure estimate and reference to its source	
Assessment method	Advanced REACH Tool v1.0

	Worker - inhalative, long-term - local
Exposure estimate	0.2 mg/m³
Risk Characterization Ratio (RCR)	0.37
	In case the identified operational conditions and risk management measures are applied:, Estimated workplace exposures are not expected to exceed the DNEL/DMEL.
Assessment method	Qualitative assessment
	Worker - contact with eyes
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.advancedreachtool.com	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Transfer of liquid products - falling liquids Splash loading Use domain: industrial
Operational conditions	
Concentration of the substance	hexamethylenediamine Content: >= 0 % - <= 100 %
Physical state	Liquid, moderate fugacity
Vapour pressure of the substance during use	12 hPa
Process temperature	80 °C
Duration and Frequency of activity	60 min 5 days per week
Indoor/Outdoor	Indoor
Room size	3,000 m3
Ventilation rate per hour	3
Amounts used	Amount per use 10 l/min
Risk Management Measures	
Ensure minimization of manual phases Regular inspection and maintenance of equipment and machines. Clean equipment and the work area every day. Avoid frequent and direct contact with substance. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
Local exhaust ventilation	Effectiveness: 90 %
Ensure reduced contact between product and adjacent air	
Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable face shield	
Risk Management Measures are based on qualitative risk characterisation.	
Exposure estimate and reference to its source	

Assessment method	Advanced REACH Tool v1.0
	Worker - inhalative, long-term - local
Exposure estimate	0.2 mg/m³
Risk Characterization Ratio (RCR)	0.37
	In case the identified operational conditions and risk management measures are applied:, Estimated workplace exposures are not expected to exceed the DNEL/DMEL.
Assessment method	Qualitative assessment
	Worker - dermal
Assessment method	Qualitative assessment
	Worker - contact with eyes
Guidance to Downstream Users	
For scaling see: http://www.advancedreachtool.com	

Contributing exposure scenario	
Use descriptors covered	PROC 3: Use in closed batch process (synthesis or formulation). Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation) Use domain: industrial
Operational conditions	
Concentration of the substance	hexamethylenediamine Content: >= 0 % - <= 100 %
Physical state	Liquid, moderate fugacity
Vapour pressure of the substance during use	48 hPa
Process temperature	110 °C
Duration and Frequency of activity	420 min 5 days per week
Indoor/Outdoor	Indoor
Room size	3,000 m3
Ventilation rate per hour	3
Open surface	0.1 m²
Risk Management Measures	
Ensure minimization of manual phases Regular inspection and maintenance of equipment and machines. Clean equipment and the work area every day. Avoid frequent and direct contact with substance. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
Ensure containment of the emission source	Effectiveness: 99.9 %
Use suitable eye protection. Use suitable chemically resistant gloves.	
Risk Management Measures are	

based on qualitative risk characterisation.	
Exposure estimate and reference to its source	
Assessment method	Advanced REACH Tool v1.0
	Worker - inhalative, long-term - local
Exposure estimate	0.058 mg/m³
Risk Characterization Ratio (RCR)	0.11
	In case the identified operational conditions and risk management measures are applied:, Estimated workplace exposures are not expected to exceed the DNEL/DMEL.
Assessment method	Qualitative assessment
	Worker - contact with eyes
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.advancedreachtool.com	

Box	Attribute	generic entries
ESCOMXML		
	ESComXMLVersionNo	2.0
	ESComPhraseCatalogVersion	1.5
	Type	SUB
Product		
	MaterialName	Hexamethylenediamine
	SubstanceMixtureIndicator	SUBSTANCE
Substance		
	Name	Hexamethylenediamine
	REACHRegistrationNumber	01-2119473981-28-0002 01-2119473981-28-0011
	CASNumber	124-09-4
	ECNumber	204-679-6
ExposureScenario		
	ExposureScenarioStructuredShortTitle	Use as Monomer
	MainUserGroup	SU3
	SectorOfUse	SU3 SU12

Box	Attribute	CS ERC 6c
ContributingScenarioEnvironmentForWorkerUse		
	EnvironmentalReleaseCategory	ERC6c
	ContributingScenarioOrder	1
FrequencyDurationEnvironment		
	ExposureType	Continuous
	EmissionDaysPerYear	300 days per year
OtherConditionsEnvironment		
	RcvSurfWater	400000 m3/d
	DilutionFactorRiver	201
	DilutionFactorCoastal	100
STPConditions		
	STPType	onsite STP
	STPEffluentInM3perDay	2000
AmountsOfUse		
UseCondQuantitativeWithUnitAndQual	Phrase	Daily amount per site
	Value	50000 kg/d
GuidanceToDU		
	GuidanceText	For scaling see: http://www.ecetoc.org/tra

Box	Attribute	CS PROC 1
ContributingScenarioWorker		
	ProcessCategory	PROC 1
	ShortTitle	Use in closed process, no likelihood of exposure.
	ContributingScenarioOrder	2
ProductArticleCharacteristics		
	PhysicalForm	Liquid, moderate fugacity
	PreparationConcentrationUpperLimit	<= 100%
	VaporPressure	48 hPa
ExposureLevel		0.01 mg/m³
FrequencyDurationHH		
	Duration	480 min
	Frequency	5 days per week
OtherConditionsWorker		
	OutoorIndoorActivity	Indoor, Outdoor
	TemperatureInCelsius	110 °C
ExposureEstimationHH		
	CalculationMethod	ECETOC TRA v2.0 Worker
	CalculationMethod	Worker – inhalative, long-term – local
	ExposureLevel	0.01 mg/m³
	RCR	0.02

Box	Attribute	CS PROC 2
ContributingScenarioWorker		
	ProcessCategory	PROC 2
	ShortTitle	Use in closed, continuous process with occasional controlled exposure. Activities with open liquid surfaces or open reservoirs - activity with undisturbed surfaces (no aerosol formation)
	ContributingScenarioOrder	3
ProductArticleCharacteristics		
	PhysicalForm	Liquid, moderate fugacity
	PreparationConcentrationUpperLimit	<= 100%
	VaporPressure	48 hPa
FrequencyDurationHH		
	Duration	420 min
	Frequency	5 days per week
ExposureLevel		0.2 mg/m³
OtherConditionsWorker		
	OutoorIndoorActivity	Indoor
	RoomSize	3,000 m3
	VentilationRate	3

Box	Attribute	CS PROC 2
RiskManagementMeasureHH		
	MeasurePhrase	Ensure minimization of manual phases
	MeasurePhrase	Regular inspection and maintenance of equipment and machines.
	MeasurePhrase	Clean equipment and the work area every day.
	MeasurePhrase	Avoid frequent and direct contact with substance.
	MeasurePhrase	Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).
	MeasurePhrase	Supervision in place to check that the RMMs in place are being used correctly and OCs followed
	MeasurePhrase	Ensure containment of the emission source
	MeasurePhrase	Use suitable eye protection.
	MeasurePhrase	Use suitable chemically resistant gloves.
	MeasurePhrase	Risk Management Measures are based on qualitative risk characterisation.
	EffectivenessInhalationInPercent	Effectiveness: 99 %
ExposureEstimation		
	CalculationMethod	Advanced REACH Tool v1.0
ExposureEstimationHH		
	ExposureRoute	Worker – contact with eyes
	CalculationMethod	Qualitative assessment
ExposureEstimationHH		
	ExposureRoute	Worder - dermal
	CalculationMethod	Qualitative assessment

Appendix VI – Glossary

BDI	German industry federation
Cefic	European Chemical Industry Council
CSA	Chemical Safety Assessment
CSR	Chemical Safety Report
DU	Downstream user
DUCC	Downstream User coordination platform
ES	Exposure Scenario
ESComXML	Exposure Scenario for Communication XML standard
Euphrac	European Phrase Catalogue
OC	Operational Conditions
PBT	Persistent, bio-accumulative and/or toxic chemicals
PROC	Process Category

RMM	Risk Management Measures
SC	Supply Chain
SDS	Safety Data Sheet
SG	Sector Group(s)
SU	Sector of Use