* SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name/designation Antifrogen® N

Art-Nr(n). 1600

Unique Formula Identifier UFI: HQ39-YFTW-H004-XVDP

Hazard components
ethanediol

* 1.2 Relevant identified uses of the substance or mixture and uses advised against

Process categories [PROC]
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC6 Calendering operations
PROC7 Industrial spraying
PROC8a Transfer of substance or mixture (charging and discharging) at non- dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
PROC15 Use as laboratory reagent
PROC17 Lubrication at high energy conditions in metal working operations
PROC18 General greasing /lubrication at high kinetic energy conditions
PROC19 Manual activities involving hand contact
PROC20 Use of functional fluids in small devices

Environmental release categories [ERC]
ERC1 Manufacture of the substance
ERC2 Formulation into mixture
ERC3 Formulation into solid matrix
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5 Use at industrial site leading to inclusion into/onto article
ERC6a Use of intermediate
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC6c Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC6d Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC7 Use of functional fluid at industrial site
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8c Widespread use leading to inclusion into/onto article (indoor)
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f Widespread use leading to inclusion into/onto article (outdoor)
ERC9a Widespread use of functional fluid (indoor)
ERC9b Widespread use of functional fluid (outdoor)

* **Product Categories [PC]**
PC1 Adhesives, sealants
PC4 Anti-Freeze and de-icing products
PC9a Coatings and paints, thinners, paint removers
PC15 Non-metal-surface treatment products
PC16 Heat transfer fluids
PC17 Hydraulic fluids
PC18 Ink and toners
PC24 Lubricants, greases, release products
PC31 Polishes and wax blends
PC32 Polymer preparations and compounds
PC34 Textile dyes, and impregnating products
PC35 Washing and cleaning products

1.3 Details of the supplier of the safety data sheet

Supplier
GHC Gerling, Holz & Co. Handels GmbH
Ruhrstraße 113
D-22761 Hamburg
Telephone +49 40 853 123 0
E-mail hamburg@ghc.de
Website www.ghc.com

Department responsible for information:
GHC Gerling, Holz & Co. Handels GmbH
Telephone +49 40 853 123 0

E-mail (competent person):
msds@ghc.de

* 1.4 Emergency telephone number

EN: Poison Information Center Mainz +49 6131 19240

* SECTION 2: Hazards identification

* 2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Acute Tox. 4, H302	
STOT RE 2, H373	

Hazard statements for health hazards
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.

* 2.2 Label elements

* Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard components
ethanediol

Hazard pictograms

GHS07

GHS08

Signal word
Warning

Hazard statements
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.

* **Precautionary statements**
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing and eye/face protection.
P314 Get medical advice/attention if you feel unwell.

* 2.3 Other hazards

* **Adverse human health effects and symptoms**
The product is skin resorptive.

* **Other adverse effects**
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Results of PBT and vPvB assessment
The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

* SECTION 3: Composition / information on ingredients

3.1 Substances

not applicable

* 3.2 Mixtures

Hazardous ingredients

CAS No.	EC No.	Substance name	Concentration	Classification according to Regulation (EC) No 1272/2008 [CLP]	SCL/ M/ ATE
107-21-1	203-473-3	ethanediol	≥ 90 ≤ 100 weight-%	Acute Tox. 4; H302 STOT RE 2; H373	ATE(oral): 7712 mg/kg ATE(dermal): > 3500 mg/kg ATE(): > 2.5 mg/L

REACH No.	Substance name
01-2119456816-28	ethanediol

Remark
The text of the H-and EUH-phrases is shown in section 16.
Ethylene glycol (Ethanediol) with corrosion inhibitors.

* SECTION 4: First aid measures

* 4.1 Description of first aid measures

* **General information**
Remove contaminated, saturated clothing immediately.
First aider: Pay attention to self-protection!

Following inhalation
Remove casualty to fresh air and keep warm and at rest.
In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registrated trademarks).
In the event of symptoms refer for medical treatment.
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Obtain medical assistance.

* **Following skin contact**
After contact with skin, wash immediately with plenty of water and soap.
In case of skin irritation, consult a physician.

* **After eye contact**
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical assistance.

* **Following ingestion**
Do NOT induce vomiting.
Rinse mouth immediately and drink plenty of water.
Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
Dizziness
Nausea
Eye Irritation
Headache

4.3 Indication of any immediate medical attention and special treatment needed

Notes for the doctor
Treat symptomatically.
Symptoms may be delayed.

* SECTION 5: Firefighting measures

* 5.1 Extinguishing media

* **Suitable extinguishing media**
Extinguishing powder
alcohol resistant foam
Water spray jet
Carbon dioxide (CO_2)

Unsuitable extinguishing media
Full water jet

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products
In case of fire formation of dangerous gases possible.
Nitrogen oxides (NOx)
Carbon monoxide
Carbon dioxide (CO_2)

* 5.3 Advice for firefighters

* **Special protective equipment for firefighters**
Wear a self-contained breathing apparatus and chemical protective clothing.

* **Additional information**
Use water spray jet to protect personnel and to cool endangered containers.
Exposure to fire may cause rupture / explosion of the containers.
Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

* SECTION 6: Accidental release measures

* 6.1 Personal precautions, protective equipment and emergency procedures

* **For non-emergency personnel**
Use personal protection equipment.
Leave the danger area.

For emergency responders
Personal protection by wearing close-fitting protective clothing and breathing apparatus.
Remove persons to safety.

6.2 Environmental precautions

Do not allow to enter into soil/subsoil.
Do not allow to enter into surface water or drains.

* 6.3 Methods and material for containment and cleaning up

* **For containment**
Prevent the liquid from spreading over a wide area (set up barriers, cover sewage systems).

* **For cleaning up**
Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).
Collect in closed and suitable containers for disposal.

6.4 Reference to other sections

Disposal: see section 13
Personal protection equipment: see section 8

* SECTION 7: Handling and storage

* 7.1 Precautions for safe handling

*

Protective measures
Use only in well-ventilated areas.
Handle and open container with care.
Usual measures for fire prevention.

Advices on general occupational hygiene
When using do not eat, drink, smoke, sniff.
Wash hands before breaks and after work.
Remove contaminated clothing and protective equipment before entering eating areas.

* 7.2 Conditions for safe storage, including any incompatibilities

*

Requirements for storage rooms and vessels
All regulations and local requirements for the storage of containers have to be respected.
Keep container tightly closed and in a well-ventilated place.
Only use containers specifically approved for the substance/product.

Storage class
10 Combustible liquids that cannot be assigned to any of the above storage classes

*

Materials to avoid
Do not store together with explosives.
Do not store with gases.
Do not store together with pyrophoric and self-heating substances.
Do not store together with oxidizing liquids or oxidizing solids.
Do not store together with infectious substances.
Do not store together with radioactive material.
Do not store together with food or feed.

7.3 Specific end use(s)

Recommendation
Exposure scenarios (ES) see annex to this safety data sheet.

* SECTION 8: Exposure controls/personal protection

* 8.1 Control parameters

*

Occupational exposure limit values

CAS No.	EC No.	Substance name	occupational exposure limit value
107-21-1	203-473-3	Ethane-1,2-diol, vapour	20 [ml/m³(ppm)] 52 [mg/m³] Short-term(ml/m³) 40 (1) Short-term(mg/m³) 104 (1) (1) 15 minutes reference period (IE)

*

DNEL worker

CAS No.	Substance name	DNEL value	DNEL type	Remark
107-21-1	ethanediol	35 mg/m³	long-term inhalative (local)	Assessment factor 2
107-21-1	ethanediol	106 mg/kg bw/day	long-term dermal (systemic)	Assessment factor 42

*

DNEL Consumer

CAS No.	Substance name	DNEL value	DNEL type	Remark
107-21-1	ethanediol	7 mg/m³	long-term inhalative (local)	Assessment factor 10
107-21-1	ethanediol	53 mg/kg bw/day	long-term dermal (systemic)	Assessment factor 84

*

PNEC

CAS No.	Substance name	PNEC Value	PNEC type	Remark
107-21-1	ethanediol	1 mg/L	aquatic, marine water	Assessment factor 100
107-21-1	ethanediol	1.53 mg/kg dw	soil	
107-21-1	ethanediol	3.7 mg/kg dw	sediment, marine water	

CAS No.	Substance name	PNEC Value	PNEC type	Remark
107-21-1	ethanediol	10 mg/L	aquatic, freshwater	Assessment factor 10
107-21-1	ethanediol	10 mg/L	aquatic, intermittent release	Assessment factor 10
107-21-1	ethanediol	37 mg/kg dw	sediment, freshwater	
107-21-1	ethanediol	199.5 mg/L	sewage treatment plant (STP)	Assessment factor 10

* **8.2 Exposure controls**

* **Appropriate engineering controls**

* **Technical measures to prevent exposure**
Industrial ventilation (local ventilation).

* **Personal protection equipment**

Eye/face protection
Protective goggles according to EN 166, in case of increased risk add protective face shield.

Hand protection
Safety gloves according to EN 374:
Glove material specification [make/type, thickness, permeation time/life]: IIR, >= 0,7 mm, > 480 min

Body protection:
Safety shoes with steel toecap.
Body covering work clothing or chemical resistant suit at increased risk.

* **Respiratory protection**
Respiratory protection necessary at:
high concentrations
Suitable respiratory protection apparatus:
Full mask complying with EN 136.
Short term: filter apparatus, filter A

* **Environmental exposure controls**

* **Remark**
Prevent release to the environment.

* SECTION 9: Physical and chemical properties

* **9.1 Information on basic physical and chemical properties**

Physical state
liquid

Colour
yellow

Odour
hardly noticeable

Safety relevant basis data

	Value	Method	Source, Remark
Odour threshold:			not determined
Melting point/freezing point	Melting point -32 °C	DIN 51583	
Boiling point or initial boiling point and boiling range	165 °C pressure 1013 hPa	ASTM D1120	
flammability			none
Lower and upper explosion limit	Upper explosion limit		not determined
Lower and upper explosion limit	Lower explosion limit 3 Vol-%		Information concerns main component.

	Value	Method	Source, Remark
Flash point	119 °C	ASTM D6450 (closed cup)	
Auto-ignition temperature	> 400 °C	DIN 51794	
Decomposition temperature	> 300 °C	DSC	
pH	approx. 8 (20°C) Concentration 100 g/L	DIN 19268	
Viscosity	kinematic 20.3 mm²/s (20°C)	DIN 51562	
Solubility(ies)	Water solubility		miscible
Partition coefficient n-octanol/water (log value)			not applicable
Vapour pressure	< 0.1 hPa (20°C)	calculated	
Density and/or relative density	1.1138 g/cm³ (20°C)	DIN 51757	
Relative vapour density			not determined
particle characteristics			not applicable

*** 9.2 Other information**

No data available

* SECTION 10: Stability and reactivity

10.1 Reactivity

See section "Possibility of hazardous reactions".

*** 10.2 Chemical stability**

The mixture is chemically stable under recommended conditions of storage, use and temperature.

10.3 Possibility of hazardous reactions

Reactions with sulphuric acid
Reactions with strong oxidising agents.
Reactions with alkalies.

*** 10.4 Conditions to avoid**

Ignition sources, open flames, glowing metal surfaces, etc.
Heat sources / heat.

10.5 Incompatible materials

Aluminium
Zinc

10.6 Hazardous decomposition products

When handled and stored appropriately, no dangerous decomposition products are known.

* SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

*** Acute toxicity**

*** Animal data**

	Effective dose	Method,Evaluation	Source, Remark
Acute oral toxicity	CAS No.107-21-1 ethanediol LD50: 7712 mg/kg Species Rat		

	Effective dose	Method,Evaluation	Source, Remark
Acute dermal toxicity	CAS No.107-21-1 ethanediol LD50: > 3500 mg/kg Species Mouse		
Acute inhalation toxicity	CAS No.107-21-1 ethanediol LC50: > 2.5 mg/L Species Rat Exposure time 6 h		

* **Assessment/classification**
Harmful if swallowed.

* **Skin corrosion/irritation**

Animal data

Result / Evaluation	Method	Source, Remark
non-irritant. Species Rabbit	BASF-Test	Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **Serious eye damage/irritation**

Animal data

Result / Evaluation	Method	Source, Remark
non-irritant. Species Rabbit	BASF-Test	Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **Sensitisation to the respiratory tract**

* **Assessment/classification**
Study scientifically not necessary.

* **Skin sensitisation**

Animal data

Result / Evaluation	Dose / Concentration	Method	Source, Remark
not sensitising.	Species Guinea pig		Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **Repeated dose toxicity (subacute, subchronic, chronic)**

	Effective dose	Method	Specific effects:	Organs affected:	Source, Remark
Subacute dermal toxicity	NOAEL(C): 2200- 4400 mg/kg bw/day Species Dog	OECD 410			Data apply to the main component.
Subchronic oral toxicity	NOEL 150 mg/kg bw/day Species Rat	OECD 408			Data apply to the main component.
Chronic oral toxicity	NOAEL 150 mg/kg bw/day Species Rat	OECD 452			Data apply to the main component.

* **Additional information**
Based on available data, the classification criteria are not met.

* **Germ cell mutagenicity**

	Value	Method	Result / Evaluation	Remark
In vitro mutagenicity/genotoxicity			negative	Information concerns main component.
In vivo mutagenicity/genotoxicity	Species Rat		negative	Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **Carcinogenicity**

Animal data

	Value	Method	Result / Evaluation	Remark
Carcinogenicity	oral NOAEL(C): 1000 mg/kg Species Rat Exposure duration 1 a			Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **Reproductive toxicity**

Animal data

	Value	Method	Result / Evaluation	Remark
Reproductive toxicity	oral NOAEL(C): > 1000 mg/kg			Information concerns main component.

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **STOT-single exposure**

* **STOT SE 1 and 2**

* **Assessment/classification**
Based on available data, the classification criteria are not met.

* **STOT-repeated exposure**

* **Animal data**

	Effective dose	Method	Specific effects:	Organs affected:	Source, Remark
Oral specific target organ toxicity (repeated exposure)	300 mg/kg Species Rat	OECD 452			Information concerns main component.

* **Assessment/classification**
May cause damage to kidneys through prolonged or repeated exposure if swallowed.

* **Aspiration hazard**

* **Remark**
Based on available data, the classification criteria are not met.

11.2 Information on other hazards

* **Other information**

May be absorbed through the skin.
Risk of strong health injuries in case of long-term exposition.
Poisonings effect on central nervous system.
The product has not been tested. The information is derived from the properties of the individual components.

* SECTION 12: Ecological information

* 12.1 Toxicity

* **Aquatic toxicity**

	Effective dose	Method,Evaluation	Source, Remark
Acute (short-term) fish toxicity	LC50: > 72860 mg/L Species Pimephales promelas (fathead minnow) Test duration 96 h	EPA 600/4-90/027	Information concerns main component.
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	EC50 > 100 mg/L Species Daphnia magna (Big water flea) Test duration 48 h	OECD 202	Information concerns main component.
Chronic (long-term) toxicity to aquatic invertebrate	not determined		
Acute (short-term) toxicity to algae and cyanobacteria	EC50 6500- 13000 mg/L Species Raphidocelis subcapitata Test duration 96 h	EPA 600/9-78-018	Information concerns main component.
Chronic (long-term) toxicity to aquatic algae and cyanobacteria	not determined		
Toxicity to other aquatic plants/organisms	not determined		
Toxicity to microorganisms	EC20 > 1995 mg/L Species activated sludge (kom.) Test duration 30 min	ISO 8192	Information concerns main component.

* 12.2 Persistence and degradability

	Value	Method	Source, Remark
Biodegradation	Degradation rate 90- 100 % Test duration 10 d	OECD 301A/ ISO 7827/ EEC 92/69/V, C.4-A	CAS No.107-21-1 ethanediol

* **Assessment/classification**
Readily biodegradable (according to OECD criteria).

* 12.3 Bioaccumulative potential

* **Assessment/classification**
Based on the n-octanol/water partition coefficients of the individual components of the mixture, accumulation in organisms is not expected.

* 12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

* 12.6 Endocrine disrupting properties

	Effective dose	Method,Evaluation	Source, Remark
Endocrine disrupting properties			See section 2.3

12.7 Other adverse effects

* **Additional ecotoxicological information**

* **Additional information**
The product has not been tested. The data are derived from the individual components of the mixture.

* SECTION 13: Disposal considerations

* 13.1 Waste treatment methods

Waste codes/waste designations according to EWC/AVV

Waste code product	Waste name
160114 *	antifreeze fluids containing hazardous substances

* **Appropriate disposal / Product**
Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.
Prevent release to the environment. No disposal via the sewage.
Disposal according to local regulations.

* **Appropriate disposal / Package**
Disposal according to local regulations.

SECTION 14: Transport information

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1 UN number or ID number	-	-	-
14.2 UN proper shipping name	-	-	-
14.3 Transport hazard class(es)	-	-	-
14.4 Packing group	-	-	-
14.5 Environmental hazards	No	No	No

14.6 Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

14.7 Maritime transport in bulk according to IMO instruments

No carriage in bulk.

Land transport (ADR/RID)

Remark
Not classified for this transport carrier.

Sea transport (IMDG)

Remark
No hazardous material as defined by the prescriptions.

Air transport (ICAO-TI / IATA-DGR)

Remark
No hazardous material as defined by the prescriptions.

* SECTION 15: Regulatory information

* 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

*** EU legislation**

* **Restrictions of occupation**
Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.
Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).

*** Other regulations (EU)**

* **To follow:**
National and local regulations concerning chemicals shall be observed.
Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Annex XVII No 3.

* **15.2 Chemical Safety Assessment**

* **National regulations**

Chemical safety assessments for substances in this mixture were carried out.

* SECTION 16: Other information

Key literature references and sources for data
Information from our suppliers and data from the "GESTIS Substances Database" and the "Registered Substances" database of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

* **Classification for mixtures and used evaluation method according to regulation (EC) No 1272/2008 [CLP]**
The mixture was classified by the manufacturer.

* **Additional information**
® Clariant International Ltd.'s registered trademark.
The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Relevant H- and EUH-phrases (Number and full text)

H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure.

Indication of changes
* Data changed compared with the previous version

Exposure scenario

Number	Title
ES 1	**Industrial use; Use as an intermediate** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15 - ERC6a Ethane-1,2-diol
ES 2	**Industrial use; Use of non-reactive processing aid at industrial site (no inclusion into or onto article)** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15 - ERC4 Ethane-1,2-diol
ES 3	**Industrial use; Distribution of substance** PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 - ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7 Ethane-1,2-diol
ES 4	**Industrial use; Formulation [mixing] of preparations and/or re-packaging** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 - ERC2 Ethane-1,2-diol
ES 5	**Industrial use; Use in polymer production** PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC15 - ERC6c Ethane-1,2-diol
ES 6	**Industrial use; Coatings and paints, thinners, paint removers** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15 - ERC4 Ethane-1,2-diol
ES 7	**Professional use; Coatings and paints, thinners, paint removers, Adhesives, sealants, Foaming, Use in polymer processing** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19 - ERC8a, ERC8c, ERC8d, ERC8f Ethane-1,2-diol
ES 8	**Consumer use; Coatings and paints, thinners, paint removers, Surface treatment** PC9a, PC15, PC18, PC31, PC24, PC34 - ERC8a, ERC8c, ERC8d, ERC8f Ethane-1,2-diol
ES 9	**Industrial use; Use in cleaning agents** PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 - ERC4 Ethane-1,2-diol
ES 10	**Professional use; Use in cleaning agents**

	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 11	**Consumer use; Use in cleaning agents**
	PC35 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 12	**Industrial use; Use in lubricants**
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 - ERC4, ERC7
	Ethane-1,2-diol
ES 13	**Industrial use; Metal working fluids**
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 - ERC4
	Ethane-1,2-diol
ES 14	**Professional use; Metal working fluids**
	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 15	**Professional use; Use in agrochemicals**
	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC11, PROC13 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 16	**Industrial use; Use in functional fluids**
	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 - ERC7
	Ethane-1,2-diol
ES 17	**Professional use; Use in functional fluids**
	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9, PROC20 - ERC9a, ERC9b
	Ethane-1,2-diol
ES 18	**Consumer use; Heat transfer fluids, Hydraulic fluids**
	PC16, PC17 - ERC9a, ERC9b
	Ethane-1,2-diol
ES 19	**Professional use; Anti-freeze and de-icing products**
	PROC1, PROC2, PROC8a, PROC8b, PROC11 - ERC8d
	Ethane-1,2-diol
ES 20	**Consumer use; Anti-freeze and de-icing products**
	PC4 - ERC8d
	Ethane-1,2-diol
ES 21	**Industrial use, Professional use; Use in laboratories**
	PROC15 - ERC8a
	Ethane-1,2-diol
ES 22	**Industrial use; Use in water treatment agents**

	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13 - ERC3, ERC4 Ethane-1,2-diol
ES 23	**Consumer use; Adhesives, sealants** PC1 - ERC8c, ERC8f Ethane-1,2-diol
ES 24	**Industrial use; Manufacture of substance, Adhesives, sealants, Foaming, Use in coatings, Use in polymer production** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15 - ERC2, ERC3, ERC5, ERC6c Ethane-1,2-diol
ES 25	**Consumer use; Insulation foams** PC32 - ERC8c, ERC8f Ethane-1,2-diol

1. ES 1: Industrial use; Use as an intermediate

1.1. Title section

Environment		
CS1:	Industrial use (Use of intermediate)	ERC6a
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Use as laboratory reagent)	PROC15

1.2. ES 1 Conditions of use affecting exposure

1.2.1 ES 1 - CS 1: Control of environmental exposure: Industrial use (Use of intermediate) (ERC6a)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

1.2.2 ES 1 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

1.2.3 ES 1 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

1.2.4 ES 1 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises

No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

1.2.5 ES 1 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

1.2.6 ES 1 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

1.2.7 ES 1 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

1.2.8 ES 1 - CS 8: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear safety goggles.

1.3. ES 1 Exposure estimation and reference to its source

1.3.2 ES 1 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

1.3.3 ES 1 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

1.3.4 ES 1 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

1.3.5 ES 1 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

1.3.6 ES 1 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

1.3.7 ES 1 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

1.3.8 ES 1 - CS 8: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

1.4. ES 1 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

2. ES 2: Industrial use; Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

2.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS9:	Industrial use (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS10:	Industrial use (Use as laboratory reagent)	PROC15

2.2. ES 2 Conditions of use affecting exposure

2.2.1 ES 2 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.2.2 ES 2 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

2.2.3 ES 2 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process

with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

2.2.4 ES 2 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

2.2.5 ES 2 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

2.2.6 ES 2 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical:

Wear suitable respiratory protection.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

2.2.7 ES 2 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

2.2.8 ES 2 - CS 8: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

2.2.9 ES 2 - CS 9: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

2.2.10 ES 2 - CS 10: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used

Storage : < 1 kg, < 1 l

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

2.3. ES 2 Exposure estimation and reference to its source

2.3.2 ES 2 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

2.3.3 ES 2 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01

systemic		
combined routes	ECETOC TRA worker v2.0	0,08

2.3.4 ES 2 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

2.3.5 ES 2 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

2.3.6 ES 2 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07

- local and systemic		
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

2.3.7 ES 2 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

2.3.8 ES 2 - CS 8: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

2.3.9 ES 2 - CS 9: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term -	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03

systemic		
combined routes	ECETOC TRA worker v2.0	0,40

2.3.10 ES 2 - CS 10: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

2.4. ES 2 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

3. ES 3: Industrial use; Distribution of substance

3.1. Title section

Environment		
CS1:	Formulation or re-packing (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article), Use of functional fluid at industrial site)	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7
Workers		
CS2:	Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a

CS6:	Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS7:	Formulation or re-packing (Use as laboratory reagent)	PROC15

3.2. ES 3 Conditions of use affecting exposure

3.2.1 ES 3 - CS 1: Control of environmental exposure: Formulation or re-packing (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article), Use of functional fluid at industrial site) (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

3.2.2 ES 3 - CS 2: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand

Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Technical conditions and measures : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

3.2.3 ES 3 - CS 3: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

3.2.4 ES 3 - CS 4: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

3.2.5 ES 3 - CS 5: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

3.2.6 ES 3 - CS 6: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

3.2.7 ES 3 - CS 7: Control of worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Amount used

Storage : < 1 kg, < 1 l

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside

hands / one hand / palm of hands.

Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

3.3. ES 3 Exposure estimation and reference to its source

3.3.2 ES 3 - CS 2: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

3.3.3 ES 3 - CS 3: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

3.3.4 ES 3 - CS 4: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

3.3.5 ES 3 - CS 5: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

3.3.6 ES 3 - CS 6: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43

Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

3.3.7 ES 3 - CS 7: Worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

3.4. ES 3 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

4. ES 4: Industrial use; Formulation [mixing] of preparations and/or re-packaging

4.1. Title section

Environment		
CS1:	Formulation or re-packing (Formulation into mixture)	ERC2
Workers		
CS2:	Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Formulation or re-packing (Mixing or blending in batch processes)	PROC5

CS6:	Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS9:	Formulation or re-packing (Use as laboratory reagent)	PROC15

4.2. ES 4 Conditions of use affecting exposure

4.2.1 ES 4 - CS 1: Control of environmental exposure: Formulation or re-packing (Formulation into mixture) (ERC2)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

4.2.2 ES 4 - CS 2: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.3 ES 4 - CS 3: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.4 ES 4 - CS 4: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed

		batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.5 ES 4 - CS 5: Control of worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.6 ES 4 - CS 6: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.7 ES 4 - CS 7: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.8 ES 4 - CS 8: Control of worker exposure: Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

4.2.9 ES 4 - CS 9: Control of worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

4.3. ES 4 Exposure estimation and reference to its source

4.3.2 ES 4 - CS 2: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

4.3.3 ES 4 - CS 3: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

4.3.4 ES 4 - CS 4: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

4.3.5 ES 4 - CS 5: Worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

4.3.6 ES 4 - CS 6: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

4.3.7 ES 4 - CS 7: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

4.3.8 ES 4 - CS 8: Worker exposure: Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

4.3.9 ES 4 - CS 9: Worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

4.4. ES 4 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

5. ES 5: Industrial use; Use in polymer production

5.1. Title section

Environment		
CS1:	Industrial use (Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article))	ERC6c
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Calendering operations)	PROC6
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Use as laboratory reagent)	PROC15

5.2. ES 5 Conditions of use affecting exposure

5.2.1 ES 5 - CS 1: Control of environmental exposure: Industrial use (Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)) (ERC6c)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

5.2.2 ES 5 - CS 2: Control of worker exposure: Industrial use (Chemical production or

refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.2.3 ES 5 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.2.4 ES 5 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.2.5 ES 5 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.2.6 ES 5 - CS 6: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

5.2.7 ES 5 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : inhalative

Technical conditions and measures : Local exhaust ventilation

Effectiveness (of a measure) : 90 %

Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

5.2.8 ES 5 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.2.9 ES 5 - CS 9: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Use as laboratory reagent No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

5.3. ES 5 Exposure estimation and reference to its source

5.3.2 ES 5 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

5.3.3 ES 5 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

5.3.4 ES 5 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term -	6,86 mg/kg bw/day (ECETOC TRA worker v2.0,	0,06

systemic	Chemical production where opportunity for exposure arises)	
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

5.3.5 ES 5 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

5.3.6 ES 5 - CS 6: Worker exposure: Industrial use (Calendering operations) (PROC6)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

5.3.7 ES 5 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

5.3.8 ES 5 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37

Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

5.3.9 ES 5 - CS 9: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

5.4. ES 5 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

6. ES 6: Industrial use; Coatings and paints, thinners, paint removers

6.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2

CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Use as laboratory reagent)	PROC15

6.2. ES 6 Conditions of use affecting exposure

6.2.1 ES 6 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

6.2.2 ES 6 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Technical conditions and measures : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent

containment conditions
Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear safety goggles.

6.2.3 ES 6 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear safety goggles.

6.2.4 ES 6 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.5 ES 6 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

6.2.6 ES 6 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to	:	Regular cleaning of equipment

prevent /limit releases, dispersion and exposure

Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.7 ES 6 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.8 ES 6 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Transfer of substance or mixture (charging/discharging) at dedicated facilities No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.9 ES 6 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.10 ES 6 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

6.2.11 ES 6 - CS 11: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

6.3. ES 6 Exposure estimation and reference to its source

6.3.2 ES 6 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

6.3.3 ES 6 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

6.3.4 ES 6 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch	0,22

	processes with occasional controlled exposure or processes with equivalent containment condition)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

6.3.5 ES 6 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

6.3.6 ES 6 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

6.3.7 ES 6 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term -	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13

systemic		
combined routes	ECETOC TRA worker v2.0	0,20

6.3.8 ES 6 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

6.3.9 ES 6 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

6.3.10 ES 6 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

6.3.11 ES 6 - CS 11: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

6.4. ES 6 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

7. ES 7: Professional use; Coatings and paints, thinners, paint removers, Adhesives, sealants, Foaming, Use in polymer processing

7.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8a, ERC8c, ERC8d, ERC8f
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes)	PROC4, PROC5
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation)	PROC13, PROC14
CS9:	Professional use (Use as laboratory reagent)	PROC15
CS10:	Professional use (Manual activities involving hand contact)	PROC19

7.2. ES 7 Conditions of use affecting exposure

7.2.1 ES 7 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor),

Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

7.2.2 ES 7 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Sample via a closed loop or other system to avoid exposure.

Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.3 ES 7 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes) (PROC4, PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.4 ES 7 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.5 ES 7 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.6 ES 7 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.7 ES 7 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min

Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.8 ES 7 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation) (PROC13, PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Note	:	Treatment of articles by dipping and pouring

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

7.2.9 ES 7 - CS 9: Control of worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

7.2.10 ES 7 - CS 10: Control of worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands and forearms.

Covers skin contact area up to : 1980 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

7.3. ES 7 Exposure estimation and reference to its source

7.3.2 ES 7 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed

continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

7.3.3 ES 7 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes) (PROC4, PROC5)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,01
combined routes	ECETOC TRA worker v2.0, Mixing or blending in batch processes	0,75

7.3.4 ES 7 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

7.3.5 ES 7 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

7.3.6 ES 7 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

7.3.7 ES 7 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

7.3.8 ES 7 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation) (PROC13, PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,01
combined routes	ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring	0,75
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation)	0,74
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation)	0,03
combined routes	ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation	0,77

7.3.9 ES 7 - CS 9: Worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

7.3.10 ES 7 - CS 10: Worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	6,47 mg/m³ (ECETOC TRA worker v2.0)	0,18
Worker - dermal, long-term - systemic	14,14 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,31

7.4. ES 7 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

8. ES 8: Consumer use; Coatings and paints, thinners, paint removers, Surface treatment

8.1. Title section

Coatings and paints, thinners, paint removers (PC9a) Non-metal surface treatment products (PC15) Ink and toners (PC18) Polishes and wax blends (PC31) Lubricants, greases, release products (PC24) Textile dyes and impregnating products (PC34)		
Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8a, ERC8c, ERC8d, ERC8f
Consumer		
CS2:	Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products)	PC9a, PC15

CS3:	Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products)	PC9a, PC15
CS4:	Consumer use (Ink and toners)	PC18
CS5:	Consumer use (Ink and toners)	PC18
CS6:	Consumer use (Polishes and wax blends)	PC31

8.2. ES 8 Conditions of use affecting exposure

8.2.1 ES 8 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

8.2.2 ES 8 - CS 2: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Remarks : Waterborne paint
Rolling, Brushing
No spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 5 %

Molecular weight : 45 g/mol
Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used

Amounts used : 1,25 kg/day

Frequency and duration of use

Application duration : 120 min
Frequency of use : 1 days per year
Exposure duration : 132 min

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to : 1900 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use

Room size	:	20 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,6
Release area	:	10 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.3 ES 8 - CS 3: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Remarks	:	Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0198 kg/min

Frequency and duration of use

Application duration	:	15 min
Frequency of use	:	2 days per year
Exposure duration	:	15 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	34 m3
Temperature	:	25 °C
Ventilation rate per hour	:	1,5
Room height	:	2,25 m

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

8.2.4 ES 8 - CS 4: Control of consumer exposure: Consumer use (Ink and toners) (PC18)

Remarks	:	Refilling

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amount per use	:	0,05 kg

Frequency and duration of use

Application duration	:	0,3 min
Frequency of use	:	104 days per year
Exposure duration	:	0,75 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.5 ES 8 - CS 5: Control of consumer exposure: Consumer use (Ink and toners) (PC18)

Remarks	:	Printing process

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

	:	0,016 kg/day

Frequency and duration of use

Exposure duration	:	600 min
Frequency of use	:	365 days per year

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	25 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,6

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.6 ES 8 - CS 6: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks	:	No spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	272 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

: 0,55 kg/day

Frequency and duration of use

Application duration	:	900 min
Frequency of use	:	1 days per year
Release duration	:	120 min
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	430 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Release area	:	22 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.3. ES 8 Exposure estimation and reference to its source

8.3.2 ES 8 - CS 2: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,72 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,10
dermal	2,77 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,05
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,15

8.3.3 ES 8 - CS 3: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,26 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,04
dermal	1,15 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,02
oral	0,13 mg/kg bw/day (Consexpo v4.1, long-term, systemic, Risk management measures are based on qualitative risk characterisation.)	
combined routes	Consexpo v4.1	0,06

8.3.4 ES 8 - CS 4: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
Chronic dermal systemic exposure	0,008 mg/kg bw/day (Consexpo v4.1)	0,0002

8.3.5 ES 8 - CS 5: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	1,29 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,18

8.3.6 ES 8 - CS 6: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	3,93 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,56
dermal	2,12 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,04
combined routes	Consexpo v4.1	0,60

8.4. ES 8 Guidance to Downstream User to evaluate whether he

works inside the boundaries set by the Exposure Scenario

No information available.

9. ES 9: Industrial use; Use in cleaning agents

9.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Industrial spraying)	PROC7
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS8:	Industrial use (Roller application or brushing)	PROC10
CS9:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

9.2. ES 9 Conditions of use affecting exposure

9.2.1 ES 9 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Concentration of the Substance in Mixture/Article	:	<= 100 %

9.2.2 ES 9 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

9.2.3 ES 9 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

9.2.4 ES 9 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

9.2.5 ES 9 - CS 5: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

9.2.6 ES 9 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 90 %
Personal protective measures : If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

9.2.7 ES 9 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Transfer of substance or mixture (charging/discharging) at dedicated facilities No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

9.2.8 ES 9 - CS 8: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

9.2.9 ES 9 - CS 9: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear safety goggles.

9.3. ES 9 Exposure estimation and reference to its source

9.3.2 ES 9 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

9.3.3 ES 9 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01

combined routes	ECETOC TRA worker v2.0	0,08

9.3.4 ES 9 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

9.3.5 ES 9 - CS 5: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

9.3.6 ES 9 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term -	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13

systemic		
combined routes	ECETOC TRA worker v2.0	0,20

9.3.7 ES 9 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

9.3.8 ES 9 - CS 8: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

9.3.9 ES 9 - CS 9: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

9.4. ES 9 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

10. ES 10: Professional use; Use in cleaning agents

10.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Chemical production where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13

10.2. ES 10 Conditions of use affecting exposure

10.2.1 ES 10 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

10.2.2 ES 10 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.3 ES 10 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.4 ES 10 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.5 ES 10 - CS 5: Control of worker exposure: Professional use (Transfer of

substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.6 ES 10 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation

Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.7 ES 10 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.

Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

10.2.8 ES 10 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

10.3. ES 10 Exposure estimation and reference to its source

10.3.2 ES 10 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22

Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

10.3.3 ES 10 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

10.3.4 ES 10 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

10.3.5 ES 10 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80

10.3.6 ES 10 - CS 6: Worker exposure: Professional use (Roller application or

brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

10.3.7 ES 10 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

10.3.8 ES 10 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,01
combined routes	ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring	0,75

10.4. ES 10 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

11. ES 11: Consumer use; Use in cleaning agents

11.1. Title section

Washing and cleaning products (PC35)

Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Consumer		
CS2:	Consumer use (Washing and cleaning products)	PC35
CS3:	Consumer use (Washing and cleaning products)	PC35
CS4:	Consumer use (Washing and cleaning products)	PC35
CS5:	Consumer use (Washing and cleaning products)	PC35
CS6:	Consumer use (Washing and cleaning products)	PC35
CS7:	Consumer use (Washing and cleaning products)	PC35

11.2. ES 11 Conditions of use affecting exposure

11.2.1 ES 11 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

11.2.2 ES 11 - CS 2: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	No spraying Default database: cleaning and washing/all purpose cleaner/liquid/mixing and loading

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 20 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,5 kg/day

Frequency and duration of use

Application duration	:	0,3 min
Frequency of use	:	104 days per year
Exposure duration	:	0,75 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.3 ES 11 - CS 3: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	No spraying Application

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 4 %
Molecular weight	:	18 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,4 kg/day

Frequency and duration of use

Application duration	:	20 min
Frequency of use	:	104 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Release area	:	10 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.4 ES 11 - CS 4: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Sprays Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0468 kg/min

Frequency and duration of use

Spray duration	:	0,41 min
Frequency of use	:	365 days per year
Exposure duration	:	60 min
Release duration	:	2,6 s

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	15 m3
Temperature	:	25 °C
Ventilation rate per hour	:	2,5
Room height	:	2,5 m

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

11.2.5 ES 11 - CS 5: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Sprays Cleaning

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0162 kg/day

Frequency and duration of use

Application duration	:	10 min
Frequency of use	:	365 days per year
Exposure duration	:	60 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	15 m3
Temperature	:	25 °C
Ventilation rate per hour	:	2,5
Release area	:	17100 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.6 ES 11 - CS 6: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Floor cleaning (liquids) Mixing operations (open systems) Loading of application equipment

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,5 kg/day

Frequency and duration of use

Application duration	:	0,3 min
Frequency of use	:	104 days per year
Exposure duration	:	0,75 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	1,0
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.7 ES 11 - CS 7: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Floor cleaning (liquids) Application

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	18 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,88 kg/day

Frequency and duration of use

Application duration	:	30 min
Frequency of use	:	104 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Release area	:	22 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.3. ES 11 Exposure estimation and reference to its source

11.3.2 ES 11 - CS 2: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type	Exposure estimate	RCR

of effects		
inhalative	0,01 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,001
dermal	0,03 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,0006
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,002

11.3.3 ES 11 - CS 3: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,61 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,09
dermal	11,70 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,22
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,31

11.3.4 ES 11 - CS 4: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,000011 mg/m³ (Consexpo v4.1, long-term, local, systemic)	
dermal	0,01 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,0002
oral	0,0006 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	
combined routes	Consexpo v4.1	0,0002

11.3.5 ES 11 - CS 5: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,11 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,02
dermal	0,12 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,002
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,02

11.3.6 ES 11 - CS 6: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,01 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,001

dermal	0,04 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,0008
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,002

11.3.7 ES 11 - CS 7: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,38 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,05
dermal	7,31 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,14
oral	Consexpo v4.1, long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,19

11.4. ES 11 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

12. ES 12: Industrial use; Use in lubricants

12.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site)	ERC4, ERC7
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

CS11: Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions)	PROC17, PROC18

12.2. ES 12 Conditions of use affecting exposure

12.2.1 ES 12 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site) (ERC4, ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

12.2.2 ES 12 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Technical conditions and measures : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

12.2.3 ES 12 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.4 ES 12 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.5 ES 12 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.6 ES 12 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.7 ES 12 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.8 ES 12 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

12.2.9 ES 12 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : dermal

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

12.2.10 ES 12 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

12.2.11 ES 12 - CS 11: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Note : Lubrication at high energy conditions in metal working operations

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear safety goggles.

12.3. ES 12 Exposure estimation and reference to its source

12.3.2 ES 12 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

12.3.3 ES 12 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

12.3.4 ES 12 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term -	0,34 mg/kg bw/day (ECETOC TRA worker v2.0,	0,003

systemic	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

12.3.5 ES 12 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

12.3.6 ES 12 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

12.3.7 ES 12 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

12.3.8 ES 12 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

12.3.9 ES 12 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

12.3.10 ES 12 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

12.3.11 ES 12 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,03
combined routes	ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations	0,10
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions)	0,13
combined routes	ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions	0,20

12.4. ES 12 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

13. ES 13: Industrial use; Metal working fluids

13.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7

CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Lubrication at high energy conditions in metal working operations)	PROC17

13.2. ES 13 Conditions of use affecting exposure

13.2.1 ES 13 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

13.2.2 ES 13 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.3 ES 13 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.4 ES 13 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed

		batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.5 ES 13 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.6 ES 13 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to	:	Ensure regular inspection, cleaning and maintenance of

prevent /limit releases, dispersion and exposure	equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.7 ES 13 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.8 ES 13 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

13.2.9 ES 13 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : dermal

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

13.2.10 ES 13 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

13.2.11 ES 13 - CS 11: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Exposure routes	:	dermal

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

13.3. ES 13 Exposure estimation and reference to its source

13.3.2 ES 13 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

13.3.3 ES 13 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

13.3.4 ES 13 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22

Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

13.3.5 ES 13 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

13.3.6 ES 13 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

13.3.7 ES 13 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

13.3.8 ES 13 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

13.3.9 ES 13 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

13.3.10 ES 13 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

13.3.11 ES 13 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,03
combined routes	ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations	0,10

13.4. ES 13 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

14. ES 14: Professional use; Metal working fluids

14.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Mixing or blending in batch processes)	PROC5
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13
CS9:	Professional use (Lubrication at high energy conditions in metal working operations)	PROC17

14.2. ES 14 Conditions of use affecting exposure

14.2.1 ES 14 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

14.2.2 ES 14 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.2.3 ES 14 - CS 3: Control of worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.2.4 ES 14 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid

Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.2.5 ES 14 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.2.6 ES 14 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.2.7 ES 14 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

14.2.8 ES 14 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

14.2.9 ES 14 - CS 9: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

14.3. ES 14 Exposure estimation and reference to its source

14.3.2 ES 14 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01

combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

14.3.3 ES 14 - CS 3: Worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,01
combined routes	ECETOC TRA worker v2.0, Mixing or blending in batch processes	0,75

14.3.4 ES 14 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

14.3.5 ES 14 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

14.3.6 ES 14 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

14.3.7 ES 14 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

14.3.8 ES 14 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01

systemic		
combined routes	ECETOC TRA worker v2.0	0,75

14.3.9 ES 14 - CS 9: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

14.4. ES 14 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

15. ES 15: Professional use; Use in agrochemicals

15.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC1, PROC2
CS3:	Professional use (Chemical production where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Non-industrial spraying)	PROC11
CS7:	Professional use (Treatment of articles by dipping and pouring)	PROC13

15.2. ES 15 Conditions of use affecting exposure

15.2.1 ES 15 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

15.2.2 ES 15 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Sample via a closed loop or other system to avoid exposure.

Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.2.3 ES 15 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.2.4 ES 15 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.2.5 ES 15 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.2.6 ES 15 - CS 6: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment

Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.2.7 ES 15 - CS 7: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

15.3. ES 15 Exposure estimation and reference to its source

15.3.2 ES 15 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38

15.3.3 ES 15 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

15.3.4 ES 15 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

15.3.5 ES 15 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

15.3.6 ES 15 - CS 6: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

15.3.7 ES 15 - CS 7: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

15.4. ES 15 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

16. ES 16: Industrial use; Use in functional fluids

16.1. Title section

Environment		
CS1:	Industrial use (Use of functional fluid at industrial site)	ERC7
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9

16.2. ES 16 Conditions of use affecting exposure

16.2.1 ES 16 - CS 1: Control of environmental exposure: Industrial use (Use of functional fluid at industrial site) (ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

16.2.2 ES 16 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

16.2.3 ES 16 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

16.2.4 ES 16 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²
Remarks : Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²
Remarks : Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Technical conditions and measures : Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Note : Chemical production where opportunity for exposure arises
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

16.2.5 ES 16 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

16.2.6 ES 16 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year
Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use
Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

16.3. ES 16 Exposure estimation and reference to its source

16.3.2 ES 16 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

16.3.3 ES 16 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

16.3.4 ES 16 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

16.3.5 ES 16 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

16.3.6 ES 16 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06

Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

16.4. ES 16 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

17. ES 17: Professional use; Use in functional fluids

17.1. Title section

Environment		
CS1:	Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor))	ERC9a, ERC9b
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Chemical production where opportunity for exposure	PROC4

	arises)	
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC9
CS6:	Professional use (Use of functional fluids in small devices)	PROC20

17.2. ES 17 Conditions of use affecting exposure

17.2.1 ES 17 - CS 1: Control of environmental exposure: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

17.2.2 ES 17 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²
Remarks : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²
Remarks : Chemical production or refinery in closed continuous process

with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

17.2.3 ES 17 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

17.2.4 ES 17 - CS 4: Control of worker exposure: Professional use (Transfer of

substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

17.2.5 ES 17 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

17.2.6 ES 17 - CS 6: Control of worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

17.3. ES 17 Exposure estimation and reference to its source

17.3.2 ES 17 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

17.3.3 ES 17 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

17.3.4 ES 17 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

17.3.5 ES 17 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

17.3.6 ES 17 - CS 6: Worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,02
combined routes	ECETOC TRA worker v2.0	0,39

17.4. ES 17 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

18. ES 18: Consumer use; Heat transfer fluids, Hydraulic fluids

18.1. Title section

Heat transfer fluids (PC16) Hydraulic fluids (PC17)		
Environment		
CS1:	Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor))	ERC9a, ERC9b
Consumer		
CS2:	Consumer use (Heat transfer fluids, Hydraulic fluids)	PC16, PC17

18.2. ES 18 Conditions of use affecting exposure

18.2.1 ES 18 - CS 1: Control of environmental exposure: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

18.2.2 ES 18 - CS 2: Control of consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Remarks : Transfer of substance or mixture (charging/discharging) at non dedicated-facilities

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

18.3. ES 18 Exposure estimation and reference to its source

18.3.2 ES 18 - CS 2: Consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,08
oral	Not applicable	
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	0,36

18.4. ES 18 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

19. ES 19: Professional use; Anti-freeze and de-icing products

19.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC1, PROC2
CS3:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS4:	Professional use (Transfer of substance or mixture	PROC8b

	(charging/discharging) at dedicated facilities)	
CS5:	Professional use (Non-industrial spraying)	PROC11

19.2. ES 19 Conditions of use affecting exposure

19.2.1 ES 19 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

19.2.2 ES 19 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

19.2.3 ES 19 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

19.2.4 ES 19 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

19.2.5 ES 19 - CS 5: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %

Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that distance between the source of emission and the worker is at least 1m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

19.3. ES 19 Exposure estimation and reference to its source

19.3.2 ES 19 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical	0,0007

- local and systemic	production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38

19.3.3 ES 19 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

19.3.4 ES 19 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80

19.3.5 ES 19 - CS 5: Worker exposure: Professional use (Non-industrial spraying)

(PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

19.4. ES 19 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

20. ES 20: Consumer use; Anti-freeze and de-icing products

20.1. Title section

Anti-freeze and de-icing products (PC4)		
Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8d
Consumer		
CS2:	Consumer use (Anti-freeze and de-icing products)	PC4
CS3:	Consumer use (Anti-freeze and de-icing products)	PC4
CS4:	Consumer use (Anti-freeze and de-icing products)	PC4

20.2. ES 20 Conditions of use affecting exposure

20.2.1 ES 20 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

20.2.2 ES 20 - CS 2: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks	:	De-icing of vehicles and similar equipment by spraying Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0468 kg/min

Frequency and duration of use

Spray duration	:	0,7 min
Frequency of use	:	365 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Room height	:	2,5 m

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

20.2.3 ES 20 - CS 3: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks	:	De-icing of vehicles and similar equipment by spraying Cleaning

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,00029 kg/day

Frequency and duration of use

Frequency of use	:	365 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 215 cm²

Other given operational conditions affecting consumers exposure

Temperature : 25 °C

20.2.4 ES 20 - CS 4: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

20.3. ES 20 Exposure estimation and reference to its source

20.3.2 ES 20 - CS 2: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,0006 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,0001
dermal	0,50 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,009
oral	0,005 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	
combined routes	Consexpo v4.1	0,009

20.3.3 ES 20 - CS 3: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	long-term, local, systemic, Not applicable	
Chronic dermal systemic exposure	4,46 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,08
Consumer - oral, long-term - systemic	long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,08

20.3.4 ES 20 - CS 4: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,08
oral	Not applicable	
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	0,36

20.4. ES 20 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

21. ES 21: Industrial use, Professional use; Use in laboratories

21.1. Title section

Environment		
CS1:	Industrial use, Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor))	ERC8a
Workers		
CS2:	Industrial use, Professional use (Use as laboratory reagent)	PROC15

21.2. ES 21 Conditions of use affecting exposure

21.2.1 ES 21 - CS 1: Control of environmental exposure: Industrial use, Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)) (ERC8a)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

21.2.2 ES 21 - CS 2: Control of worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

21.3. ES 21 Exposure estimation and reference to its source

21.3.2 ES 21 - CS 2: Worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

21.4. ES 21 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

22. ES 22: Industrial use; Use in water treatment agents

22.1. Title section

Environment		
CS1:	Industrial use (Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC3, ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS7:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

22.2. ES 22 Conditions of use affecting exposure

22.2.1 ES 22 - CS 1: Control of environmental exposure: Industrial use (Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC3, ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

22.2.2 ES 22 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

22.2.3 ES 22 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

22.2.4 ES 22 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

22.2.5 ES 22 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

22.2.6 ES 22 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Transfer of substance or mixture (charging/discharging) at dedicated facilities
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

22.2.7 ES 22 - CS 7: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

22.3. ES 22 Exposure estimation and reference to its source

22.3.2 ES 22 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

22.3.3 ES 22 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

22.3.4 ES 22 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

22.3.5 ES 22 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

22.3.6 ES 22 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

22.3.7 ES 22 - CS 7: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

22.4. ES 22 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

23. ES 23: Consumer use; Adhesives, sealants

23.1. Title section

Adhesives, sealants (PC1)		
Environment		
CS1:	Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8c, ERC8f
Consumer		
CS2:	Consumer use (Adhesives, sealants)	PC1

23.2. ES 23 Conditions of use affecting exposure

23.2.1 ES 23 - CS 1: Control of environmental exposure: Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8c, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

23.2.2 ES 23 - CS 2: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Worst case assumption
Mixing operations (open systems)
Loading of application equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 0,075 %

Molecular weight : 3.000 g/mol
Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used

Amounts used : 9 kg/day

Frequency and duration of use

Application duration : 75 min
Frequency of use : 0,25 days per year
Exposure duration : 75 min

Human factors not influenced by risk management

Covers skin contact area up to : 110 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Room size : 58 m3
Temperature : 25 °C
Ventilation rate per hour : 0,5

Release area : 4 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

23.3. ES 23 Exposure estimation and reference to its source

23.3.2 ES 23 - CS 2: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	4,1 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,59
dermal	0,26 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,005
oral	long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,60

23.4. ES 23 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

24. ES 24: Industrial use; Manufacture of substance, Adhesives, sealants, Foaming, Use in coatings, Use in polymer production

24.1. Title section

Environment		
CS1:	Industrial use (Formulation into mixture, Formulation into solid matrix, Use at industrial site leading to inclusion into/onto article, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article))	ERC2, ERC3, ERC5, ERC6c
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or	PROC3, PROC4

	processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS12:	Industrial use (Use as laboratory reagent)	PROC15

24.2. ES 24 Conditions of use affecting exposure

24.2.1 ES 24 - CS 1: Control of environmental exposure: Industrial use (Formulation into mixture, Formulation into solid matrix, Use at industrial site leading to inclusion into/onto article, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)) (ERC2, ERC3, ERC5, ERC6c)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

24.2.2 ES 24 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.3 ES 24 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.4 ES 24 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.5 ES 24 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in

combination with specific activity training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

24.2.6 ES 24 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid

Vapour pressure : 0,123 hPa

Amount used

Amounts used : 0,6 L/min

Frequency and duration of use

Exposure duration : 360 min

Frequency of use : <= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Room size : > 1000 m3

Risk Management Measures

Technical conditions and measures : Local exhaust ventilation

Effectiveness (of a measure) : 50 %

Note : Ensure that the direction of airflow is clearly away from the worker.

Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

Effectiveness (of a measure) : 90 %

Personal protective measures : Wear suitable protective clothing.
Wear suitable coveralls to prevent exposure to the skin.

Effectiveness (of a measure) : 80 %

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that distance between the source of emission and the worker is at least 1m.

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure that direction of application is only horizontal or downward.

Organisational measures to prevent /limit releases, dispersion and exposure : Regular cleaning of work area

Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.7 ES 24 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.8 ES 24 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.9 ES 24 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.10 ES 24 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear safety goggles.

24.2.11 ES 24 - CS 11: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

24.2.12 ES 24 - CS 12: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used

Storage : < 1 kg, < 1 l

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear safety goggles.

24.3. ES 24 Exposure estimation and reference to its source

24.3.2 ES 24 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007

- local and systemic		
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

24.3.3 ES 24 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

24.3.4 ES 24 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

24.3.5 ES 24 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

24.3.6 ES 24 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

24.3.7 ES 24 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

24.3.8 ES 24 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37

Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

24.3.9 ES 24 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

24.3.10 ES 24 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

24.3.11 ES 24 - CS 11: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

24.3.12 ES 24 - CS 12: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37

- local and systemic		
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

24.4. ES 24 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.

25. ES 25: Consumer use; Insulation foams

25.1. Title section

Polymer preparations and compounds (PC32)		
Environment		
CS1:	Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8c, ERC8f
Consumer		
CS2:	Consumer use (Polymer preparations and compounds)	PC32

25.2. ES 25 Conditions of use affecting exposure

25.2.1 ES 25 - CS 1: Control of environmental exposure: Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8c, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

25.2.2 ES 25 - CS 2: Control of consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 5 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used

Amount per use : 0,825 kg

Frequency and duration of use

Exposure duration : 30 min
Frequency of use : 0,2 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 1900 cm²
Breathing volume : 1,5 m3/day

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Room size : 57,5 m3
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

25.3. ES 25 Exposure estimation and reference to its source

25.3.2 ES 25 - CS 2: Consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

Route of exposure and type of effects	Exposure estimate	RCR
inhalative	0,06 mg/m³ (Consexpo v4.1, long-term, local, systemic)	0,009
dermal	0,007 mg/kg bw/day (Consexpo v4.1, long-term, systemic)	0,0008
oral	long-term, systemic, Not applicable	
combined routes	Consexpo v4.1	0,01

25.4. ES 25 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

No information available.