9.3. Exposure scenario 3: Use at industrial site - Use in electroplating or metal surface treatment

Market sector: Electroplating and surface treatment
PC 14: Metal surface treatment products, including galvanic and electroplating products

Sector of use:
SU 16, Manufacture of computer, electronic and optical products, electrical equipment

Environment contributing scenario(s):	
Use in electroplating or metal surface treatment	ERC 5
Worker contributing scenario(s):	
Handling of solutions	PROC 8b
Small scale handling of solutions	PROC 9
Handling of medium dusty materials	PROC 26
Wet chemical process in fully contained system	PROC 1
Closed continuous wet chemical process	PROC 2
Wet chemical batch process in closed system	PROC 3
Open or semi-closed wet chemical process	PROC 4
Mixing or blending in batch process	PROC 5
Laboratory analyses	PROC 15
Plating	PROC 13
Wet cleaning	PROC 8a
Vacuum cleaning	PROC 26

Explanation on the approach taken for the ES

During this use, the substance is chemically transformed into silver. Any subsequent handling steps after transformation of the substance are not in the scope of this ES.

9.3.1. Environmental contributing scenario 1: Use in electroplating or metal surface treatment

9.3.1.1. Conditions of use

The conditions of use are as described in the generic exposure scenario (GES) below.

9.3.1.2. Releases

The GES and associated risk assessment are concerned with releases of silver to waste-water and air during the use of AgCN in electroplating or metal surface treatment in an industrial scenario. This waste-water is assumed to be treated at a municipal STP before discharge to freshwater. Exposure assessment for the aquatic environment is based on calculation of the maximum safe tonnage (Msafe) of AgCN that can be used for electroplating; modelling of environmental exposure is based on release factors detailed in the SpERC for 'Industrial use of metals and metal compounds in metallic coating'[12]. Msafe is calculated using release factors (RFs) adjusted to 10% of the values recommend in the SpERC for base metals based on the monetary value of silver (see Section 9.0.2).

1. Title **ES3: Use at industrial site - Use in electroplating or metal surface treatment**	
Life cycle	Use of silver cyanide in electroplating or metal surface

[12] ARCHE (2013) Industrial use of metals and metal compounds in metallic coating. SpERC code Eurometaux 5.1 v2.1. Available online at http://www.arche-consulting.be/metal-csa-toolbox/SPERCs-tool-for-metals/

	treatment
Systematic title based on use descriptor	ERC: ERC 5
2. Operational conditions and risk management measures	
2.1 Control of environmental exposure	
Environmental related free short title	Use at industrial site in electroplating or metal surface treatment
Systematic title based on use descriptor (environment)	ERC 5 (Industrial use resulting in inclusion into or onto a matrix)
Processes, tasks, activities covered (environment)	Industrial use of silver cyanide for electroplating or metal surface treatment: As defined by SpERC for 'Industrial use of metals and metal compounds in metallic coating'[8]
Environmental Assessment Method	Estimates based on SpERC for 'Industrial use of metals and metal compounds in metallic coating'[8] are used for calculation of maximum tonnage that can be used safely without risk to the environment
Product characteristics Silver cyanide as solid or aqueous solution. Environmental assessment is based on the measured release factors detailed in the SpERC for 'Industrial use of metals and metal compounds in metallic coating' and default characteristics for environmental compartments detailed in the ECHA technical guidance and EUSES model.	
Amounts used	
Maximum annual safe use at a site (Msafe)[13]	5.6 tonnes AgCN (4.5 tonnes Ag metal equivalent)
Frequency and duration of use	
Pattern of release to the environment	220 days per year per site (SpERC for Industrial use of metals and metal compounds in metallic coating'[8])
Environment factors not influenced by risk management	
Receiving surface water flow rate	STP: 2,000 m^3/d (default) Receiving water: 18,000 m^3/d (default)
Dilution capacity, freshwater	Env ES: Discharge to freshwater via STP: DF = 10 (default)
Dilution capacity, marine	NR
Other given operational conditions affecting environmental exposure	
None	
Technical conditions and measures at process level (source) to prevent release	
Appropriate process control systems shall be implemented.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Waste water: ES Discharge to freshwater via STP: On-site wastewater treatment by chemical precipitation, sedimentation, electrolysis, reverse osmosis, ion exchange and/or filtration. Efficiency >99% (typical values reported in SpERC for 'Industrial use of metals and metal compounds in metallic coating') And off-site wastewater treatment plant, municipal STP Efficiency 80% (based on assessment of available monitoring data and literature) Release factor after on-site treatment: 500 g/T (SpERC RF adjusted for monetary value of Ag as detailed in section 9.02) **Air:** ES: Treatment of air emissions by cyclones, filters (e.g. fabric, bag, HEPA or ceramic), electrostatic	

[13] All Msafe exposure scenarios for use of AgCN are based on the maximum amount of silver (metal equivalent) that can be safely used in a specific application without an unacceptable level of risk to the environment. It is therefore important to consider the total use of silver compounds for each specific downstream use at an individual site and where relevant, combine the contribution from each silver compound if a number of different Ag compounds are used for the same downstream use.

precipitators and/or wet scrubbers.
Efficiency 95 to >99% (typical values reported in SpERC for 'Industrial use of metals and metal compounds in metallic coating')
Release factor after on-site treatment: 200 g/T (SpERC RF adjusted to 10% based on monetary value of silver as detailed in section 9.02)

Organizational measures to prevent/limit release from site

Regular operator training.

Conditions and measures related to municipal sewage treatment plant (if applicable)

Municipal Sewage Treatment Plant (STP)	Yes
Discharge rate of the Municipal STP	2 000 m^3/d (default)
Fate of the sludge from Municipal STP	Hazardous waste produced during the manufacture and downstream use is sent to a recycler only marginal amounts are sent to a landfill or an incinerator. Waste containing silver is recycled for almost a 100%

Conditions and measures related to external treatment of waste for disposal

Hazardous wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the silver content of the waste is elevated enough, internal or external recovery/recycling should be considered.

Fraction of daily/annual use expected in waste: 0%
Appropriate waste codes: 06 03 11*, 06 04 05*, 06 05 02*, 11 01 05*, 11 01 09*, 11 01 11*, 11 01 16*, 11 03 01*, 15 02 02*, 19 08 06*, 20 01 40

Suitable disposal: Hazardous waste produced during the manufacture and downstream use is sent to a recycler only marginal amounts are sent to a landfill or an incinerator. Waste containing silver is recycled for almost a 100%

A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2016)

Conditions and measures related to external recovery of waste

The focus of the silver industry is on the minimisation of waste by optimising the process and by utilizing residues and wastes as far as possible. The residues arising from different stages of the production process are therefore used as raw materials for other processes and an extensive network of metallurgical operators has been established for many years to increase the recovery of metals and eliminate the quantities of waste for disposal.

3. Exposure and risk estimation

Environment [based on total Ag emissions]
ERC 5

ES3 Use at industrial site - Use in electroplating or metal surface*

Compartment	Unit	PNEC	$PEC_{regional}$	C_{local}	PEC	RCR	Methods for calculation of environmental concentrations
ES Discharge to STP	mg Ag/L	0.025 mg/L	6.06 x10^{-6} mg/L	1.01 x10^{-3} mg/L	1.01 x10^{-3} mg/L	0.040	SpERC RFs applied to Msafe tonnage and dilution factor at municipal sewage works
ES Freshwater via STP	mg Ag/L	4.0 x10^{-5} mg/L	6.06 x10^{-6} mg/L	2.62 x10^{-5} mg/L	3.23 x10^{-5} mg/L	0.81	SpERC RFs applied to Msafe tonnage and Ag-specific values for STP removal efficiency and dilution in ultimate receiving water body

Freshwater sediment via STP	mg/kg w.w.	96.4 mg/kg	2.13 mg/kg	1.34 mg/kg	3.47 mg/kg	0.36	SpERC RFs applied to Msafe tonnage and Ag-specific values for STP removal efficiency and dilution in ultimate receiving water body
Terrestrial	mg/kg w.w.	1.24 mg/kg	0.086 mg/kg	1.80 $x10^{-6}$ mg/kg	8.60 $x10^{-2}$ mg/kg	0.069	Modelled increase in soil concentrations due to deposition from atmospheric emissions (i.e. assuming no application of sewage sludge to land)
* All concentrations reported as Ag equivalent due to the silver metal PNEC used for assessment.							

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment

Scaling tool: Metals EUSES IT tool (free download: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool)

Scaling of the release to air and water environment includes:

- Refining of the release factor to air and waste water and/or and the efficiency of the air filter and wastewater treatment facility.
- Adjustment of the flow rate for the receiving water body and subsequent dilution factor.

9.3.1.3. Exposure and risks for man via the environment

Assessment of risks for man via the environment is based on inhalation exposure to airborne particulates containing silver released to the atmosphere during the use of AgCN in electroplating or metal surface treatment.

Annual emission to air (kg Ag)	Emission days per year	Concentration in local air (mg Ag/m^3)	Annual average concentration in air (mg Ag/m^3)	DNEL (mg Ag/m^3)	RCR
0.9	300	8.3 $x10^{-7}$	6.9 $x10^{-7}$	0.04	2.09 $x10^{-5}$

9.3.2. Worker contributing scenario 1: Handling of solutions (PROC 8b)

9.3.2.1. Conditions of use

Task(s) covered with this contributing scenario: Transfer processes, such as replenishment.

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 10. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**10 µg/m³** (External Tool (MEASE))	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**34.29 µg/kg bw/day** (External Tool (MEASE))	RCR = 0.069
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.097

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for

local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.3. Worker contributing scenario 2: Small scale handling of solutions (PROC 9)

9.3.3.1. Conditions of use

Task(s) covered with this contributing scenario: Transfer processes, such as replenishment (including manual replenishment).

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 11. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic,	**10 µg/m³** (External Tool (MEASE))	RCR = 0.028

Route of exposure and type of effects	Exposure concentration	Risk characterisation
long-term		
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**34.29 µg/kg bw/day** (External Tool (MEASE))	RCR = 0.069
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.097

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.4. Worker contributing scenario 3: Handling of medium dusty materials (PROC 26)

9.3.4.1. Conditions of use

Task(s) covered with this contributing scenario: Transfer processes, such as replenishment (including manual replenishment).

	Method
Product (article) characteristics	
• Physical form of substance: Solid	External Tool (MEASE)
• Maximum emission potential of the substance: Medium (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)

	Method
• Exterior local exhaust ventilation: Lower confidence limit (industrial use) (Standard efficiency) [Effectiveness Inhal: 75%]	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Gloves: Protective gloves according to EN 374 have to be worn. Gloves have to be changed according to manufacturer's information or when damaged, whatever is the earlier. [Effectiveness Dermal: 90%]	External Tool (MEASE)
• Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 12. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**100 µg/m³** (External Tool (MEASE))	RCR = 0.284
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**14.14 µg/kg bw/day** (External Tool (MEASE))	RCR = 0.028
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.312

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.5. Worker contributing scenario 4: Wet chemical process in fully contained system (PROC 1)

9.3.5.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Closed system without breaches	External Tool (MEASE)
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: None	External Tool (MEASE)
• Level of containment: Closed process	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 13. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**1 µg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**1.71 µg/kg bw/day** (External Tool	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
	(MEASE))	
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.6. Worker contributing scenario 5: Closed continuous wet chemical process (PROC 2)

9.3.6.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
• Level of containment: Closed process	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to	

	Method
the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 14. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**1 µg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**3.43 µg/kg bw/day** (External Tool (MEASE))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.7. Worker contributing scenario 6: Wet chemical batch process in closed system (PROC 3)

9.3.7.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)

	Method
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
• Level of containment: Closed process	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 15. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**10 µg/m³** (External Tool (MEASE))	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**1.71 µg/kg bw/day** (External Tool (MEASE))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.032

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.8. Worker contributing scenario 7: Open or semi-closed wet chemical process (PROC 4)

9.3.8.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 16. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**50 µg/m³** (External Tool (MEASE))	RCR = 0.142
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**3.43 µg/kg bw/day** (External Tool (MEASE))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.149

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.9. Worker contributing scenario 8: Mixing or blending in batch process (PROC 5)

9.3.9.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)

	Method
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 17. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**50 µg/m³** (External Tool (MEASE))	RCR = 0.142
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**3.43 µg/kg bw/day** (External Tool (MEASE))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.149

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not

expected. Therefore, risks are adequately controlled.

9.3.10. Worker contributing scenario 9: Laboratory analyses (PROC 15)

9.3.10.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 18. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**10 µg/m³** (External Tool (MEASE))	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**17.14 µg/kg bw/day** (External Tool	RCR = 0.034

Route of exposure and type of effects	Exposure concentration	Risk characterisation
	(MEASE))	
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.063

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.11. Worker contributing scenario 10: Plating (PROC 13)

9.3.11.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Intermittent	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (low hazard) (Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as	

	Method
appropriate.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 19. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**10 µg/m³** (External Tool (MEASE))	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**34.29 µg/kg bw/day** (External Tool (MEASE))	RCR = 0.069
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.097

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.12. Worker contributing scenario 11: Wet cleaning (PROC 8a)

9.3.12.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solution, suspension	External Tool (MEASE)
• Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)

	Method
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Direct handling	External Tool (MEASE)
• Contact level: Extensive	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Gloves: Protective gloves according to EN 374 have to be worn. Gloves have to be changed according to manufacturer's information or when damaged, whatever is the earlier. [Effectiveness Dermal: 90%]	External Tool (MEASE)
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation (Due to potential adverse effects of the substance to the respiratory tract, RPE (minimum assigned protection factor of 10) is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.)	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 20. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**50 µg/m³** (External Tool (MEASE))	RCR = 0.142
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**34.29 µg/kg bw/day** (External Tool (MEASE))	RCR = 0.069
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.211

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.

9.3.13. Worker contributing scenario 12: Vacuum cleaning (PROC 26)

9.3.13.1. Conditions of use

	Method
Product (article) characteristics	
• Physical form of substance: Solid, powder / dust	External Tool (MEASE)
• Maximum emission potential of the substance: High (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.)	External Tool (MEASE)
• Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]	External Tool (MEASE)
Technical and organisational conditions and measures	
• Pattern of use: Non-dispersive use	External Tool (MEASE)
• Pattern of exposure control: Non-direct handling	External Tool (MEASE)
• Contact level: Extensive	External Tool (MEASE)
• Integrated local exhaust ventilation: Lower confidence limit (industrial use) (Standard efficiency) [Effectiveness Inhal: 84%] *Surrogate exposure determinant used to reflect the efficiency of a vacuum cleaner.*	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Gloves: Protective gloves according to EN 374 have to be worn. Gloves have to be changed according to manufacturer's information or when damaged, whatever is the earlier. [Effectiveness Dermal: 90%]	External Tool (MEASE)
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes (Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.)	

9.3.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 21. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**160 µg/m³** (External Tool (MEASE))	RCR = 0.454
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**1.41 µg/kg bw/day** (External Tool (MEASE))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.457

Remarks on exposure data

External Tool (MEASE)

- Dermal, systemic, long-term:
  For calculation of systemic exposure, the exposure estimate for total dermal loading as obtained in MEASE (reported in mg/day) is divided by a body weight of 70 kg for workers.

Conclusion on risk characterisation

Further information on the risk characterisation for local or acute systemic effects via inhalation, for local dermal effects and local effects to the eyes is given in Section 9.0.2.3.

Under the prescribed conditions of use, exposure is well below the DNELs and local effects are not expected. Therefore, risks are adequately controlled.