

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

CHLOORSTABIL BE-REG-00257

Version 1.0

Print Date 18.07.2024

Revision date / valid from 21.04.2023

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

1.1. Product identifier

Trade name : CHLOORSTABIL BE-REG-00257
Substance name : sodium hypochlorite, solution
Index-No. : 017-011-00-1
CAS-No. : 7681-52-9
EC-No. : 231-668-3
REACH Status : Each component of the product is either registered or exempted from registration obligations according to REACH Regulation (EC) No 1907/2006

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

Use of the Substance/Mixture : Biocidal product
Uses advised against : At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company : Brenntag N.V.
Nijverheidslaan 38
BE 8540 Deerlijk
Telephone : +32 (0)56 77 6944
Telefax : +32 (0)56 77 5711
E-mail address : info@brenntag.be
Responsible/issuing person : Master Data Administration

Company : Brenntag Nederland B.V.
Donker Duyvisweg 44
NL 3316 BM Dordrecht
Telephone : +31 (0)78 65 44 944
Telefax : +31 (0)78 65 44 919
E-mail address : info@brenntag.nl
Responsible/issuing person : Master Data Administration

1.4. Emergency telephone number

Emergency telephone number : Belgium: Antipoison Center - Brussels TEL: +32(0)70 245 245
Netherlands: National Poisoning Information Center - Bilthoven
TEL: +31(0) 88 755 8000 (Only for the purpose of informing

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medical personnel in cases of acute intoxications)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1B	---	H314
Serious eye damage	Category 1	---	H318
Short-term (acute) aquatic hazard	Category 1	---	H400
Long-term (chronic) aquatic hazard	Category 2	---	H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health : See section 11 for toxicological information.
 Physical and chemical hazards : See section 9/10 for physicochemical information.
 Potential environmental effects : See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :



Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
 H314 Causes severe skin burns and eye damage.
 H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

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Prevention	: P273 P280	Avoid release to the environment. Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	: P301 + P330 + P331 P303 + P361 + P353 P305 + P351 + P338 + P310 P390	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor. Absorb spillage to prevent material damage.

Additional Labelling:

EUH031 Contact with acids liberates toxic gas.

Hazardous components which must be listed on the label:

- sodium hypochlorite, solution

2.3. Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: 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.

Toxicological information: 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.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

		Classification (REGULATION (EC) No 1272/2008)	
Hazardous components	Amount [%]	Hazard class / Hazard category	Hazard statements

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sodium hypochlorite, solution

Index-No.	: 017-011-00-1	>= 10 - < 20	Met. Corr.1	H290
CAS-No.	: 7681-52-9		Skin Corr.1B	H314
EC-No.	: 231-668-3		Eye Dam.1	H318
EU REACH-	: 01-2119488154-34-xxxx		STOT SE3	H335
Reg. No.			Aquatic Acute1	H400
			Aquatic Chronic1	H410
			M-Factor (Acute aquatic toxicity): 10	EUH031
			M-Factor (Chronic aquatic toxicity): 1	

sodium hydroxide

Index-No.	: 011-002-00-6	>= 0,5 - < 1	Met. Corr.1	H290
CAS-No.	: 1310-73-2		Skin Corr.1A	H314
EC-No.	: 215-185-5		Eye Dam.1	H318
EU REACH-	: 01-2119457892-27-xxxx			
Reg. No.			specific concentration limit	
			Skin Irrit. 2; H315	
			0,5 - < 2 %	
			Eye Irrit. 2; H319	
			0,5 - < 2 %	
			Skin Corr. 1A; H314	
			>= 5 %	
			Skin Corr. 1B; H314	
			2 - < 5 %	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	: Take off all contaminated clothing immediately.
If inhaled	: In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
In case of skin contact	: Wash off immediately with plenty of water. If irritation appears or if the contamination is extensive, seek medical advice.
In case of eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
If swallowed	: Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting - seek medical advice. If a person vomits when lying on his back, place him in the recovery position.

4.2. Most important symptoms and effects, both acute and delayed

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Symptoms : See Section 11 for more detailed information on health effects and symptoms.

Effects : See Section 11 for more detailed information on health effects and symptoms.

4.3. Indication of any immediate medical attention and special treatment needed

Treatment : No information available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product itself does not burn.

Unsuitable extinguishing media : High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : Incomplete combustion may form toxic pyrolysis products.

Hazardous combustion products : Chlorine, Hydrogen chloride gas, chlorine oxides

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)

Further advice : Cool closed containers exposed to fire with water spray. Heating will cause a pressure rise - with risk of bursting. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment. Wear respiratory protection. Keep away unprotected persons. Provide adequate ventilation. Danger of slipping if spilled. Avoid contact with skin and eyes. Do not breathe vapour.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

CHLOORSTABIL BE-REG-00257**6.3. Methods and materials for containment and cleaning up**

Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal. Do not keep the container sealed.

Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Advice on safe handling : Do not keep the container sealed. Handle and open container with care. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in an area equipped with alkali resistant flooring. Keep only in the original container. Store in a receptacle equipped with a vent. Suitable materials for containers: polyethylene; Polyvinylchloride; Unsuitable materials for containers: Iron; Copper; Aluminium; Stainless steel

Advice on protection against fire and explosion : The product is not flammable. Normal measures for preventive fire protection.

Further information on storage conditions : Keep in a well-ventilated place. Protect against light. Store in cool place.

Advice on common storage : Keep away from food, drink and animal feedingstuffs. Do not store together with acids and ammonium salts.

7.3. Specific end use(s)

Specific use(s) : No information available.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Contains no substances with occupational exposure limit values.

Contains no substances with occupational exposure limit values.

Component:	sodium hypochlorite, solution	CAS-No. 7681-52-9
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Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL

Workers, Acute - systemic effects, Acute - local effects, Inhalation : 3,1 mg/m³

DNEL

Workers, Long-term - systemic effects, Long-term - local effects, Inhalation : 1,55 mg/m³

DNEL

Workers, Long-term - local effects, Skin contact : 0,5 %

DNEL

Consumers, Long-term - systemic effects, Long-term - local effects, Inhalation : 1,55 mg/m³

DNEL

Consumers, Acute - local effects, Acute - systemic effects, Inhalation : 3,1 mg/m³

DNEL

Consumers, Long-term - systemic effects, Ingestion : 0,26 mg/kg bw/day

Predicted No Effect Concentration (PNEC)

Fresh water : 0,21 µg/l

Marine water : 0,042 µg/l

Sewage treatment plant (STP) : 4,69 mg/l

Intermittent releases : 0,26 µg/l

Soil :

Exposition is not expected.

Marine sediment :

Exposition is not expected.

Fresh water sediment :

Exposition is not expected.

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Secondary poisoning : 11,1 mg/kg food

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL

Workers, Long-term - local effects, Inhalation : 1,0 mg/m³

DNEL

Consumers, Long-term - local effects, Inhalation : 1,0 mg/m³

Other Occupational Exposure Limit Values

Belgium. OELs. Exposure Limit Values to Chemical Substances at Work, Code of Well-being at work, Book VI, Title 1, as amended, Time Weighted Average (TWA):
2 mg/m³

Other Occupational Exposure Limit Values

Belgium. OELs. Exposure Limit Values to Chemical Substances at Work, Code of Well-being at work, Book VI, Title 1, as amended, Time Weighted Average (TWA):
2 mg/m³

Other Occupational Exposure Limit Values

Belgium. OELs. Exposure Limit Values to Chemical Substances at Work, Code of Well-being at work, Book VI, Title 1, as amended, Time Weighted Average (TWA):
2 mg/m³

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : Use respirator with appropriate filter if vapours or aerosol are released.
Respiratory protection complying with EN 141.
Recommended Filter type:
Combination filter:B-P2
Combination filter:B-P3
In case of intensive or longer exposure use self-contained breathing apparatus.

CHLOORSTABIL BE-REG-00257*Hand protection*

Advice : Protective gloves complying with EN 374.
The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : butyl-rubber
Break through time : 8 h
Glove thickness : 0,5 mm

Material : Polyvinylchloride
Break through time : 8 h
Glove thickness : 0,5 mm

Material : polychloroprene
Break through time : 8 h
Glove thickness : 0,5 mm

Eye protection

Advice : Safety goggles

Skin and body protection

Advice : alkali resistant protective clothing

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
If material reaches soil inform authorities responsible for such cases.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties**

Form : No data available
Physical state : liquid
Colour : yellow
Odour : irritating

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Odour Threshold	:	No data available
Melting point/freezing point	:	< -16 °C
Boiling point/boiling range	:	Decomposition at boiling point.
Flammability	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Flash point	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Self-Accelerating decomposition temperature (SADT)	:	No data available
pH	:	> 12,5 Concentration: 100 %
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Dissolution Rate	:	No data available
Partition coefficient: n-octanol/water	:	log Pow: -3,42 (20 °C)
Dispersion Stability	:	No data available
Vapour pressure	:	17 hPa (20 °C)
Relative density	:	No data available
Density	:	1,22 g/cm ³ (20 °C)
Bulk density	:	No data available
Relative vapour density	:	No data available

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Particle characteristics
No data available

9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Advice : Contact with acids liberates toxic gas.

10.2. Chemical stability

Advice : Decomposes on heating.
Decomposes on exposure to light.

10.3. Possibility of hazardous reactions

Hazardous reactions : May develop chlorine if mixed with acidic solutions.

10.4. Conditions to avoid

Conditions to avoid : HeatAvoid UV light.

10.5. Incompatible materials

Materials to avoid : Acids, ammonium compounds, Acetic anhydride, Organic materials, Hydrogen peroxide, metal salts, Copper, Nickel, Iron

10.6. Hazardous decomposition products

Hazardous decomposition products : Hydrogen chloride gas, Chlorine, chlorine oxides

SECTION 11: Toxicological information

11.1. Information on the hazard classes within the meaning of Regulation (EC) No. 1272/2008

Data for the product	
Acute toxicity	
Oral	
Not classified based on the calculation method according to CLP regulation.	
Inhalation	
Not classified based on the calculation method according to CLP regulation.	
Dermal	

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Not classified based on the calculation method according to CLP regulation.

Irritation

Skin

Result : Classified based on the calculation method according to CLP regulation.

Eyes

Result : Classified based on the calculation method according to CLP regulation.

Sensitisation

Result : Not classified based on the calculation method according to CLP regulation.

CMR effects

CMR Properties

- Carcinogenicity : Not classified based on the calculation method according to CLP regulation.
- Mutagenicity : Not classified based on the calculation method according to CLP regulation.
- Teratogenicity : Not classified based on the calculation method according to CLP regulation.
- Reproductive toxicity : Not classified based on the calculation method according to CLP regulation.

Specific Target Organ Toxicity

Single exposure

Remarks : Not classified based on the calculation method according to CLP regulation.

Repeated exposure

Remarks : Not classified based on the calculation method according to CLP regulation.

Other toxic properties

Repeated dose toxicity

No data available

Aspiration hazard

Not applicable,

Component: sodium hypochlorite, solution CAS-No. 7681-52-9

Acute toxicity

CHLOORSTABIL BE-REG-00257**Oral**

LD50 : > 1100 mg/kg (Rat; Test substance: Chlorine) (OECD Test Guideline 401)

Inhalation

LC50 : > 10,5 mg/l (Rat; 1 h; Test substance: Chlorine) (OECD Test Guideline 403)

Dermal

LD50 : > 20000 mg/kg (Rabbit; Test substance: Chlorine) (OECD Test Guideline 402)

Irritation**Skin**

Result : corrosive effects (Human)

Eyes

Result : Causes serious eye damage. (Rabbit) (OECD Test Guideline 405)

Sensitisation

Result : not sensitizing (Buehler Test; Guinea pig) (OECD Test Guideline 406)

CMR effects**CMR Properties**

Carcinogenicity : Animal testing did not show any carcinogenic effects.
Mutagenicity : In vitro tests did not show mutagenic effects
In vivo tests did not show mutagenic effects
Teratogenicity : Did not show teratogenic effects in animal experiments.
Reproductive toxicity : Animal testing did not show any effects on fertility.

Genotoxicity in vitro

Result : negative (Ames test; Salmonella typhimurium) (OECD Test Guideline 471)
ambiguous (Chromosome aberration test in vitro; Chinese hamster fibroblasts) (OECD Test Guideline 473)

CHLOORSTABIL BE-REG-00257**Genotoxicity in vivo**

Result : negative (Chromosome aberration test in vivo; Mouse) (OECD Test Guideline 474)
negative (Chromosome aberration test in vivo; Mouse) (OECD Test Guideline 475)
ambiguous (Effects on sperm morphology and melotic micronuclei; Mouse)

Teratogenicity

NOAEL : 5,7 mg/kg
Teratog. (Rat)Test substance
Chlorine

Reproductive toxicity

NOAEL : 5 mg/kg
Parent (Rat)(Oral)Effects on fertilityTest substance
Chlorine

Specific Target Organ Toxicity**Single exposure**

Inhalation : Target Organs: Respiratory systemMay cause respiratory irritation.Experience with human exposure

Repeated exposure

Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties**Repeated dose toxicity**

NOAEL : 50 mg/kg
(Rat)(Oral; 90 Days) (OECD Test Guideline 408)

Aspiration hazard

No aspiration toxicity classification,

Further information

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Other relevant toxicity information : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Component: **sodium hydroxide** **CAS-No. 1310-73-2**

Acute toxicity
Oral

No valid data available.

Inhalation

No valid data available.

Dermal

No valid data available.

Irritation
Skin

Result : Very corrosive (Rabbit) (No guideline followed)

Eyes

Result : corrosive effects (Rabbit; Test substance: 10% solution) (OECD Test Guideline 405)Equivalent or similar to OECD Guideline

Sensitisation

Result : not sensitizing (Human) (No guideline followed)Patch test on human volunteers did not demonstrate sensitisation properties.

CMR effects
CMR Properties

Carcinogenicity : No experimental references for cancerogenity available.

Mutagenicity : In vitro tests did not show mutagenic effects
In vivo tests did not show mutagenic effects

Teratogenicity : No data available

Reproductive toxicity : Not expected to impair fertility.

Specific Target Organ Toxicity
Single exposure

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Remarks : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties

Aspiration hazard

Not applicable,

11.2. Information on other hazards

Data for the product

Endocrine disrupting properties

Assessment : 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.

SECTION 12: Ecological information

12.1. Toxicity

Component: sodium hypochlorite, solution CAS-No. 7681-52-9

Acute toxicity

Fish

LC50 : 0,06 mg/l (Salmo gairdneri; 96 h)
 NOEC : 0,04 mg/l (Menidia peninsulae (tidewater silverside); 96 h)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 0,141 mg/l (Daphnia magna (Water flea); 48 h)

algae

NOEC : 0,0021 mg/l (algae; 7 Days) Fresh water

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Bacteria

EC50 : > 3 mg/l (activated sludge; 3 h)

Chronic toxicity

Fish

NOEC : 0,04 mg/l (Menidia peninsulae (tidewater silverside); 28 d)

Aquatic invertebrates

NOEC 0,007 mg/l (Eastern oyster (Crassostrea virginica); 15 d) Marine water

M-Factor

M-Factor (Acute Aquat. Tox.) : 10
M-Factor (Chron. Aquat. Tox.) : 1

Component: sodium hydroxide CAS-No. 1310-73-2

Acute toxicity

Fish

LC50 : 125 mg/l (Gambusia affinis; 96 h) (No guideline followed)
LC50 : 145 mg/l (Poecilia reticulata; 24 h) (No guideline followed)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 40,4 mg/l (Ceriodaphnia (water flea); 48 h) (No guideline followed)

algae

: No data available

12.2. Persistence and degradability

Component: sodium hypochlorite, solution CAS-No. 7681-52-9

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Persistence and degradability

Persistence

Result : The product can be degraded by abiotic (e.g. chemical or photolytic) processes.
decomposition by hydrolysis.
Half-life in fresh-water < 1 day

Biodegradability

Result : The methods for determining the biological degradability are not applicable to inorganic substances.

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Persistence and degradability

Persistence

Result : No data available

12.3. Bioaccumulative potential

Component:	sodium hypochlorite, solution	CAS-No. 7681-52-9
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Bioaccumulation

Result : log Kow -3,42 (20 °C)
: Does not bioaccumulate.

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Bioaccumulation

Result : Does not bioaccumulate.

12.4. Mobility in soil

Component:	sodium hypochlorite, solution	CAS-No. 7681-52-9
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Mobility

Water : The product is mobile in water environment.
Soil : Highly mobile in soils
Air : not volatile (Henry's Constant)

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Mobility

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Water	:	Good soluble in water.
Air	:	not volatile
Soil	:	Low potential for adsorption (based on substance properties).

12.5. Results of PBT and vPvB assessment

Data for the product

Results of PBT and vPvB assessment

Result	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
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Component:	sodium hypochlorite, solution	CAS-No. 7681-52-9
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Results of PBT and vPvB assessment

Result	:	The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.
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12.6. Endocrine disrupting properties

Data for the product

Endocrine disrupting potential	:	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.
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12.7. Other adverse effects

Component:	sodium hypochlorite, solution	CAS-No. 7681-52-9
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Additional ecological information

Result	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
Contaminated packaging	:	Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.
European Waste	:	No waste code according to the European Waste Catalogue

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Catalogue Number can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information

14.1. UN number or ID number

1791

14.2. UN proper shipping name

ADR : HYPOCHLORITE SOLUTION
RID : HYPOCHLORITE SOLUTION
IMDG : HYPOCHLORITE SOLUTION

14.3. Transport hazard class(es)

ADR-Class : 8
(Labels; Classification Code; Hazard Identification Number; Tunnel restriction code) 8; C9; 80; (E)
RID-Class : 8
(Labels; Classification Code; Hazard Identification Number) 8; C9; 80
IMDG-Class : 8
(Labels; EmS) 8; F-A, S-B

14.4. Packaging group

ADR : II
RID : II
IMDG : II

14.5. Environmental hazards

Environmentally hazardous according to ADR : yes
Environmentally hazardous according to RID : yes
Marine Pollutant according to IMDG-Code : yes

14.6. Special precautions for user

Not applicable.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

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Data for the product

EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

EU. Directive : Qualifying quantity for the application of Lower-tier
2012/18/EU (SEVESO requirements: 100 tonnes; Part 1: Categories of dangerous
III) on major accident substances; Hazardous to the Aquatic Environment in
hazards involving Category Acute 1 or Chronic 1
dangerous substances,
Annex I

Qualifying quantity for the application of Upper-tier
requirements: 200 tonnes; Part 1: Categories of dangerous
substances; Hazardous to the Aquatic Environment in
Category Acute 1 or Chronic 1

Qualifying quantity for the application of Lower-tier
requirements: 200 tonnes; Part 1: Categories of dangerous
substances; Hazardous to the Aquatic Environment in
Category Chronic 2

Qualifying quantity for the application of Upper-tier
requirements: 500 tonnes; Part 1: Categories of dangerous
substances; Hazardous to the Aquatic Environment in
Category Chronic 2

Component: **sodium hypochlorite, solution** **CAS-No. 7681-52-9**

EU. Chemicals Subject : ; The substance/mixture does not fall under this legislation.
to PIC Procedure:
Regulation 649/2012/EU
on export and import of
dangerous chemicals, as
amended

EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

Point Nos.: , 75; Listed

EU. Directive : Qualifying quantity for the application of Lower-tier
2012/18/EU (SEVESO requirements: 100 tonnes; Part 1: Categories of dangerous
III) on major accident substances; Hazardous to the Aquatic Environment in
hazards involving Category Acute 1 or Chronic 1
dangerous substances,
Annex I

Qualifying quantity for the application of Upper-tier
requirements: 200 tonnes; Part 1: Categories of dangerous

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substances; Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1

Notification status

sodium hypochlorite, solution:

Regulatory List	Notification	Notification number
EINECS	YES	231-668-3
DSL	YES	
KECI (KR)	YES	KE-31506
ENCS (JP)	YES	(1)-237
ISHL (JP)	YES	(1)-237
NZIOC	YES	HSR003698
IECSC	YES	
INSQ	YES	
ONT INV	YES	
TCSI	YES	
PICCS (PH)	YES	
TSCA	YES	
PHARM (JP)	YES	
VN INVL	YES	
TH INV	YES	55-1-05972
TH INV	YES	2828.90
AU AIICL	YES	

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Notification status

sodium hydroxide:

Regulatory List	Notification	Notification number
EINECS	YES	215-185-5
DSL	YES	
KECI (KR)	YES	97-1-136
KECI (KR)	YES	KE-31487
ENCS (JP)	YES	(1)-410
ISHL (JP)	YES	(1)-410
NZIOC	YES	HSR001547
INSQ	YES	
IECSC	YES	
ONT INV	YES	
TCSI	YES	
PICCS (PH)	YES	
TSCA	YES	
VN INVL	YES	
TH INV	YES	2815.11
TH INV	YES	2815.12
TH INV	YES	55-1-01354
PHARM (JP)	YES	
AU AIICL	YES	

15.2. Chemical safety assessment

Chemical Safety Assessments have been carried out for these substances.

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SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Full text of the Notes referred to under section 3.

Abbreviations and Acronyms

AU AIICL	Australia. Industrial Chemicals Act (AIIIC) List
BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
DSL	Canada. Environmental Protection Act, Domestic Substances List
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
ENCS (JP)	Japan. Kashin-Hou Law List
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
IECSC	China. Inventory of Existing Chemical Substances
INSQ	Mexico. National Inventory of Chemical Substances
ISHL (JP)	Japan. Inventory of Industrial Safety & Health
KECI (KR)	Korea. Existing Chemicals Inventory
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NDSL	Canada. Environmental Protection Act. Non-Domestic Substances List
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration

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NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
NZIOC	New Zealand. Inventory of Chemicals
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
ONT INV	Canada. Ontario Inventory List
PBT	persistent, bioaccumulative and toxic
PHARM (JP)	Japan. Pharmacopoeia Listing
PICCS (PH)	Philippines. Inventory of Chemicals and Chemical Substances
PNEC	predicted no-effect concentration
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
UK REACH Auth. No.:	UK REACH Authorisation Number
UK REACH AuthAppC. No.	UK REACH Authorisation Application Consultation Number
UK REACH-Reg.No	UK REACH Registration Number
STOT	specific target organ toxicity
SVHC	substance of very high concern
TCSI	Taiwan. Existing Chemicals Inventory
TH INV	Thailand. Existing Chemicals Inventory from FDA
TSCA	US. Toxic Substances Control Act

Further information

- Key literature references and sources for data : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
- Methods used for product classification : The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
- Hints for trainings : The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
- Other information : The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.
- The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in

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the text.

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES447
2	Use as an intermediate	3	8, 9	19	1, 2, 3, 4, 8a, 8b, 9	6a	NA	ES9182
3	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	NA	ES9179
4	Industrial use	3	4, 5, 6a, 6b, 8, 9, 10, 11	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 13, 14	6a, 6b, 6d	NA	ES523
5	Use in Cleaning Agents	3	4	35	5, 7, 8a, 9, 10, 13	6b	NA	ES9191
6	Use in Cleaning Agents	22	NA	35	5, 9, 10, 11, 13, 15	8a, 8b, 8d, 8e	NA	ES538
7	Use in sewage water treatment	3	23	20, 37	1, 2, 3, 4, 5, 8a, 8b, 9	6b	NA	ES9187
8	Use in textile industry	3	5	34	1, 2, 3, 4, 5, 8a, 8b, 9, 13	6b	NA	ES9185
9	Use in paper industry	3	NA	26	1, 2, 3, 4, 5, 8a, 8b, 9	6b	NA	ES9189
10	Consumer use	21	NA	19, 34, 35, 37	NA	8a, 8b, 8d, 8e	NA	ES653

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1. Short title of Exposure Scenario 1: Manufacture of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage	2.000 m3/d

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	treatment plant effluent	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m ³ /day
	Light activity	
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
Relevant for all PROCs	---	Worker - inhalative, long-term - local and systemic.	0,705mg/m ³	0,4548
PROC1, PROC2, PROC3, PROC4	General exposures	Worker - inhalative, short-term - local and systemic	0,540mg/m ³	0,1742
PROC1, PROC2, PROC3, PROC4	Laboratory activities	Worker - inhalative, short-term - local and systemic	0,252mg/m ³	0,081
PROC1, PROC2, PROC3, PROC4	Equipment maintenance	Worker - inhalative, short-term - local and systemic	0,480mg/m ³	0,155
PROC8a, PROC8b, PROC9	---	Worker - inhalative, short-term - local and systemic	0,498mg/m ³	0,161

Qualitative assessment dermal. Contact is only accidental The exposure estimate represents the 90th percentile of the exposure distribution

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.
 Exposure values based on the EU Risk Assessment Report on chlorine (2007)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
 Ensure that gas alarms are installed
 Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 2: Use as an intermediate

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Chemical product category	PC19: Intermediate
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC6a

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded
Conditions and measures related	Type of Sewage	Municipal sewage treatment plant

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to sewage treatment plant	Treatment Plant	
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m3/day
	Light activity	
Other operational conditions affecting workers exposure	Indoor use.	
	Assumes activities are at ambient temperature., Outdoor location is covered by the worst case inside location	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

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Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,02mg/m ³	0,01
PROC2, PROC3	---	Worker - inhalative, long-term - local	1,10mg/m ³	0,71
PROC4	---	Worker - inhalative, long-term - local	1,20mg/m ³	0,77
PROC8a, PROC8b	---	Worker - inhalative, long-term - local	1,25mg/m ³	0,81
PROC9	---	Worker - inhalative, long-term - local	0,91mg/m ³	0,59

The short-term exposure is covered by the assessment of long-term exposure. Qualitative assessment dermal. Qualitative approach used to conclude safe use.

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
Ensure that gas alarms are installed
Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 3: Formulation & (re)packing of substances and mixtures

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC15: Use as laboratory reagent</p>
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water

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Organizational measures to prevent/limit release from the site	Soil	Substance release to soil can be excluded
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m3/day
	Light activity	
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance. Ensure samples are obtained under containment or extract ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

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Environment

Qualitative approach used to conclude safe use.

Workers

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15	---	Worker - inhalative, long-term - local and systemic.	0,705mg/m ³	0,4548
PROC1, PROC2, PROC3, PROC4, PROC5	General exposures	Worker - inhalative, short-term - local and systemic	0,540mg/m ³	0,1742
PROC1, PROC2, PROC3, PROC4, PROC5	Laboratory activities	Worker - inhalative, short-term - local and systemic	0,252mg/m ³	0,081
PROC1, PROC2, PROC3, PROC4, PROC5	Equipment maintenance	Worker - inhalative, short-term - local and systemic	0,480mg/m ³	0,155
PROC8a, PROC8b, PROC9	---	Worker - inhalative, short-term - local and systemic	0,498mg/m ³	0,161
PROC14	---	Worker - inhalative, long-term	0,23mg/m ³	0,15

Qualitative assessment dermal. Contact is only accidental The exposure estimate represents the 90th percentile of the exposure distribution

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure values based on the EU Risk Assessment Report on chlorine (2007)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Ensure that gas alarms are installed

Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 4: Industrial use

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU4: Manufacture of food products SU5: Manufacture of textiles, leather, fur SU6a: Manufacture of wood and wood products SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU11: Manufacture of rubber products
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

2.1 Contributing scenario controlling environmental exposure for: ERC6a, ERC6b, ERC6d

Substance is a unique structure, Non-hydrophobic, Low potential to biaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 15%
Amount used	Amounts used in the EU (tonnes/year)	999999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d

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	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 15%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

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2.5 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 5%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 820 cm ²
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus. Wear protective gloves/ protective clothing/ eye protection/ face protection. Wear chemically resistant gloves. (Efficiency: 90 %)	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

EU RAR

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
Relevant for all PROCs	---	Worker - inhalative, long-term - local and systemic.	0,705mg/m ³	0,4548

Qualitative assessment dermal. Contact is only accidental The exposure estimate represents the 90th percentile of the exposure distribution

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the

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Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure values based on the EU Risk Assessment Report on chlorine (2007)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Ensure that gas alarms are installed

Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 5: Use in Cleaning Agents

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU4: Manufacture of food products
Chemical product category	PC35: Washing and cleaning products (including solvent based products)
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d

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Conditions and measures related to external treatment of waste for disposal

Waste treatment

External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC5, PROC7, PROC8a, PROC9, PROC10, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m ³ /day
	Light activity	
Other operational conditions affecting workers exposure	Indoor use.	
	Assumes activities are at ambient temperature., Outdoor location is covered by the worst case inside location	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

Advanced REACH Tool (ART model)

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC8a	---	Worker - inhalative, long-term - local	1,25mg/m ³	0,81
PROC7	---	Worker - inhalative, long-term - local	1,20mg/m ³	0,77
PROC9	---	Worker - inhalative, long-term - local	0,91mg/m ³	0,59
PROC10	---	Worker - inhalative, long-term - local	1,00mg/m ³	0,65
PROC13	---	Worker - inhalative, long-term - local	0,70mg/m ³	0,45

The short-term exposure is covered by the assessment of long-term exposure. Qualitative assessment dermal. Qualitative approach used to conclude safe use.

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
Ensure that gas alarms are installed
Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 6: Use in Cleaning Agents

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category	PC35: Washing and cleaning products (including solvent based products)
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC9: Transfer of substance or preparation 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 PROC15: Use as laboratory reagent
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%
Amount used	Amounts used in the EU (tonnes/year)	999999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Do not let product enter drains., Onsite wastewater treatment required
	Soil	Substance release to soil can be excluded
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d

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Conditions and measures related to external treatment of waste for disposal

Waste treatment

External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC5, PROC9, PROC10, PROC11, PROC13, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Avoid direct contact with the chemical/the product/the preparation by establishing organisational measures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection Personal measures have to be applied in case of potential exposure only.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC11

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 0.05%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Amount used		0,005 kg
Frequency and duration of use	Exposure duration	120 min
	Frequency of use	4 Times per day
Other operational conditions affecting workers exposure	Indoor/Outdoor use.	
	Assumes activities are at ambient temperature.	

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Technical conditions and measures to control dispersion from source towards the worker	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Organisational measures to prevent /limit releases, dispersion and exposure	Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Avoid direct contact with the chemical/the product/the preparation by establishing organisational measures.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

EASE v2.0

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC11	---	worker inhalation, long term - systemic	0,0017mg/m ³	0,0011

Qualitative assessment dermal. Contact is only accidental Exposure is considered negligible

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
Ensure that gas alarms are installed
Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 7: Use in sewage water treatment

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU23: Electricity, steam, gas water supply and sewage treatment
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents PC37: Water treatment chemicals
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded
Conditions and measures related	Type of Sewage	Municipal sewage treatment plant

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to sewage treatment plant	Treatment Plant	
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m3/day
	Light activity	
Other operational conditions affecting workers exposure	Indoor use.	
	Assumes activities are at ambient temperature., Outdoor location is covered by the worst case inside location	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

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Workers

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,02mg/m ³	0,01
PROC2, PROC3	---	Worker - inhalative, long-term - local	1,10mg/m ³	0,71
PROC4	---	Worker - inhalative, long-term - local	1,20mg/m ³	0,77
PROC5, PROC8a, PROC8b	---	Worker - inhalative, long-term - local	1,25mg/m ³	0,81
PROC9	---	Worker - inhalative, long-term - local	0,91mg/m ³	0,59

The short-term exposure is covered by the assessment of long-term exposure. Qualitative assessment dermal. Qualitative approach used to conclude safe use.

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
 Ensure that gas alarms are installed
 Change gloves, if duration of activity exceeds breakthrough time
 These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

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1. Short title of Exposure Scenario 8: Use in textile industry

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur
Chemical product category	PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC13: Treatment of articles by dipping and pouring</p>
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b

Substance is a unique structure, Non-hydrophobic, Low potential to biaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded

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prevent/limit release from the site

Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m3/day
	Light activity	
Other operational conditions affecting workers exposure	Indoor use.	
	Assumes activities are at ambient temperature., Outdoor location is covered by the worst case inside location	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

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Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,02mg/m ³	0,01
PROC2, PROC3	---	Worker - inhalative, long-term - local	1,10mg/m ³	0,71
PROC4	---	Worker - inhalative, long-term - local	1,20mg/m ³	0,77
PROC5, PROC8a, PROC8b	---	Worker - inhalative, long-term - local	1,25mg/m ³	0,81
PROC9	---	Worker - inhalative, long-term - local	0,91mg/m ³	0,59
PROC13	---	Worker - inhalative, long-term - local	0,70mg/m ³	0,45

The short-term exposure is covered by the assessment of long-term exposure. Qualitative assessment dermal. Qualitative approach used to conclude safe use.

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
 Ensure that gas alarms are installed
 Change gloves, if duration of activity exceeds breakthrough time

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1. Short title of Exposure Scenario 9: Use in paper industry

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Chemical product category	PC26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b

Substance is a unique structure, Non-hydrophobic, Low potential to biaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Amounts used in the EU (tonnes/year)	999,999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
	Soil	Substance release to soil can be excluded

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Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
	Process Temperature	90 °C
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Human factors not influenced by risk management	Body weight	70 kg
	Respiration volume under conditions of use	10 m3/day
	Light activity	
Other operational conditions affecting workers exposure	Indoor use.	
	Assumes activities are at ambient temperature., Outdoor location is covered by the worst case inside location	
Technical conditions and measures to control dispersion from source towards the worker	provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Drain down system prior to equipment opening or maintenance.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that no inhalable aerosols are generated Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. Ensure containment of the emission source	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection In the case of hazardous fumes, wear self contained breathing apparatus.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

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Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,02mg/m ³	0,01
PROC2, PROC3	---	Worker - inhalative, long-term - local	1,10mg/m ³	0,71
PROC4	---	Worker - inhalative, long-term - local	1,20mg/m ³	0,77
PROC5, PROC8a, PROC8b	---	Worker - inhalative, long-term - local	1,25mg/m ³	0,81
PROC9	---	Worker - inhalative, long-term - local	0,91mg/m ³	0,59

The short-term exposure is covered by the assessment of long-term exposure. Qualitative assessment dermal. Qualitative approach used to conclude safe use.

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.
 Ensure that gas alarms are installed
 Change gloves, if duration of activity exceeds breakthrough time
 These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

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1. Short title of Exposure Scenario 10: Consumer use

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC19: Intermediate PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC35: Washing and cleaning products (including solvent based products) PC37: Water treatment chemicals
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Substance is a unique structure, Non-hydrophobic, Low potential to bioaccumulate

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%
Amount used	Amounts used in the EU (tonnes/year)	999999 ton(s)/year
Frequency and duration of use	Continuous exposure	360 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Substance release to air can be excluded
	Water	Risk from environmental exposure is driven by freshwater., Do not release wastewater directly into environment., Onsite wastewater treatment required, No discharge of substance into waste water
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling consumer exposure for: PC35: Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)

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Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 3%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
Amount used	Amount used per event	0,005 kg
Frequency and duration of use	Exposure duration	7,5 min
	Frequency of use	4 Times per day
Other given operational conditions affecting consumers exposure	Indoor use.	
	Room size	4 m3
	Ventilation rate per hour	0,5

2.3 Contributing scenario controlling consumer exposure for: PC35

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 0,5%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
Frequency and duration of use	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin areas	Palm of one Hand 420 cm ²
Other given operational conditions affecting consumers exposure	Indoor use.	
	Room size	4 m3
	Ventilation rate per hour	0,5
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear impervious chemical resistant protective gloves.

2.4 Contributing scenario controlling consumer exposure for: PC19, PC34

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 0.05%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
Frequency and duration of use	Frequency of use	2 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 820 cm ²

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Other given operational conditions affecting consumers exposure	Indoor use.	
	Room size	4 m3
	Ventilation rate per hour	0,5
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear impervious chemical resistant protective gloves.

2.5 Contributing scenario controlling consumer exposure for: PC37

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 0,1%
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	25 hPa
Amount used		2000 ml
Frequency and duration of use	Frequency of use	1 Times per day

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Consumers

EU RAR

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC34	Laundry bleaching/pre-treatment	consumer inhalation, long term - systemic	1,68µg/m³	0,000108
PC35	Hard surface cleaning	consumer inhalation, long term - systemic	1,68µg/m³	0,000108
PC34	Laundry bleaching/pre-treatment	consumer dermal, long term - local	0,035mg/kg bw/day	< 1
PC35	Hard surface cleaning	consumer dermal, long term - local	0,002mg/kg bw/day	< 1
---	Drinking water, adult	Consumer oral, acute	0,0003mg/kg bw/day	---
---	Drinking water, adult	Consumer oral, long-term	0,003mg/kg bw/day	0,011
---	Drinking water, children	Consumer oral, acute	0,0007mg/kg bw/day	---
---	Drinking water, children	Consumer oral, long-term	0,0033mg/kg bw/day	0,011

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

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

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