

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

Version 16.0

Print Date 2021/09/20

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MSDS code: MSHY100

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

1.1. Product identifier

Trade name : PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
 Substance name : sodium hypochlorite, solution
 CAS-No. : 7681-52-9
 EC-No. : 231-668-3
 EU REACH-Reg. No. : 01-2119488154-34-xxxx
 Synonyms and Other names : DAIRY HYPOCHLORITE

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.
 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 UK Limited
 Alpha House, Lawnswood Business Park
 GB LS16 6QY Leeds
 Telephone : +44 (0) 113 3879 200
 Telefax : +44 (0) 113 3879 280
 E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
 +44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation S.I. 2019/720 (GB CLP)

Regulation S.I. 2019/720 (GB CLP)

Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1B	---	H314

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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 S.I. 2019/720 (GB CLP)**

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	:	
Prevention	:	P273 Avoid release to the environment. P260 Do not breathe gas/ mist/ vapours/ spray. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact

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Disposal	:	P308 + P310	lenses, if present and easy to do. Continue rinsing.
		P313	IF exposed or concerned: Immediately call a POISON CENTER/doctor. Get medical advice/ attention.
		P501	Dispose of contents/ container in accordance with the local/regional/international regulations.

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

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients
3.1. Substances

|| Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (Regulation S.I. 2019/720 (GB CLP))	
		Hazard class / Hazard category	Hazard statements
sodium hypochlorite, solution			
Index-No. : 017-011-00-1	≥ 10 - ≤ 15	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 Aquatic Chronic1	H400 H410
sodium hydroxide			
Index-No. : 011-002-00-6	< 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.			

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

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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 for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician immediately. |
| | 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 | : Rinse mouth with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately. |
| | Protection of First Aid Responders | : First Aid responders should pay attention to self-protection and use the recommended protective clothing. |

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

- | | | |
|--|----------|---|
| | Symptoms | : See Section 11 for more detailed information on health effects and symptoms. If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. |
| | Effects | : See Section 11 for more detailed information on health effects and symptoms. Causes severe skin burns and eye damage. |

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

- | | | |
|--|-----------|--------------------------|
| | Treatment | : Treat symptomatically. |
|--|-----------|--------------------------|

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 | : Heating or fire can release toxic gas. |
|--|--------------------------------------|--|

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|| 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, eyes and clothing. 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.

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**

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- || 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.
- || 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.
- || Suitable packaging materials : Polyethylene, Polyvinylchloride
- || Unsuitable packaging materials : , Iron, Copper, Aluminium, Stainless steel

7.3. Specific end use(s)

Specific use(s) : No information available.

SECTION 8: Exposure controls/personal protection
8.1. Control parameters

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

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Workers, Long-term - systemic effects, Long-term - local effects, Inhalation	:	1.55 mg/m ³
DNEL		
Workers, Long-term - local effects, Skin contact	:	0.5 %
DNEL		
Consumers, Long-term - systemic effects, Long-term - local effects, Inhalation	:	1.55 mg/m ³
DNEL		
Consumers, short-term, Inhalation	:	3.1 mg/m ³
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)	:	0.03 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.	:	

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), as amended, Short Term Exposure Limit (STEL): 2 mg/m ³ , (15 minutes)
ELV (IE), Short Term Exposure Limit (STEL): 2 mg/m ³ , (15 minutes)

8.2. Exposure controls**Appropriate engineering controls**

|| Refer to protective measures listed in sections 7 and 8.

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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.
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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	: Tightly fitting safety goggles Ensure that eyewash stations and safety showers are close to the workstation location.
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Skin and body protection

Advice	: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific workplace. Wear appropriate chemical resistant clothing and boots. alkali resistant protective clothing
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Environmental exposure controls

General advice	: Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
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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	:	liquid
Colour	:	yellow green
Odour	:	of Chlorine
Odour Threshold	:	no data available
pH	:	> 11
Melting point/range	:	ca. -30 - -20 °C 13 - 16% solution
Boiling point/boiling range	:	ca. 100 °C (1013 hPa) 13 - 16% solution
Flash point	:	Not applicable
Evaporation rate	:	no data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	ca. 20 hPa (20 °C) 13 - 16% solution
Relative vapour density	:	no data available
Density	:	1.11 g/cm ³ (20 °C) 10% solution
Water solubility	:	completely miscible
Partition coefficient: n-octanol/water	:	log Kow -3.42 (20 °C)
Auto-ignition temperature	:	no data available
Thermal decomposition	:	> 111 °C
Viscosity, dynamic	:	3 - 4 mPa.s (20 °C) 13 - 16% solution
Explosivity	:	Product is not explosive.
Oxidizing properties	:	Oxidizing agents

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9.2. Other information

|| Corrosion to metals : Corrosive to metals

SECTION 10: Stability and reactivity
10.1. Reactivity

|| Advice : Contact with acids liberates toxic gas.
Is corrosive to metals.

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 : Keep away from open flames, hot surfaces and sources of
ignition. Keep away from direct sunlight.
|| Thermal decomposition : > 111 °C

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 toxicological effects
Data for the product
Acute toxicity
Oral

|| Please find this information in the listing of the
component/components below in this section.

Inhalation

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

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Dermal

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

Irritation
Skin

|| Result : Causes severe skin burns and eye damage.

Eyes

|| Result : Causes eye burns.

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$ **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)

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$ **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 : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

SECTION 12: Ecological information
12.1. Toxicity
Data for the product
Chronic toxicity
Long-term (chronic) aquatic hazard

Result : Very toxic to aquatic life with long lasting effects.

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

Bacteria

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

Chronic toxicity
Fish

NOEC : 0.04 mg/l (Menidia peninsulae (tidewater silverside); 28 d)

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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

12.2. Persistence and degradability

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

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.

12.3. Bioaccumulative potential

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

Bioaccumulation

Result : log Kow -3.42 (20 °C)
 : Does not bioaccumulate.

12.4. Mobility in soil

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

Mobility

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

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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.

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

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.

12.6. Other adverse effects

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

Additional ecological information

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

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 : Dispose of contaminated packaging in the same way as the product. In accordance with local and national regulations. Empty containers retain residue and can be dangerous.

European Waste Catalogue Number : No waste code according to the European Waste Catalogue 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

1791

14.2. UN proper shipping name

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ADR	: HYPOCHLORITE SOLUTION
RID	: HYPOCHLORITE SOLUTION
IMDG	: HYPOCHLORITE SOLUTION (Sodium hypochlorite)

14.3. Transport hazard class(es)

ADR-Class (Labels; Classification Code; Hazard Identification Number; Tunnel restriction code)	: 8 8; C9; 80; (E)
RID-Class (Labels; Classification Code; Hazard Identification Number)	: 8 8; C9; 80
IMDG-Class (Labels; EmS)	: 8 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. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Data for the product

EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC)	: Point Nos.: , 3; Listed
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EU. Directive 2012/18/EU (SEVESO III) Annex I : Lower-tier requirements: 100 tonnes; Part 1: Categories of dangerous substances; E1: Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1
Upper-tier requirements: 200 tonnes; Part 1: Categories of dangerous substances; E1: Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1

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

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

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

EU. Directive 2012/18/EU (SEVESO III) Annex I : Lower-tier requirements: 100 tonnes; Part 1: Categories of dangerous substances; E1: Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1
Upper-tier requirements: 200 tonnes; Part 1: Categories of dangerous substances; E1: Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1

AwSV (DE) : WGK 2: obviously hazardous to water: 815; This classification does not limit the use of the substance, when used skillfully and in compliance with relevant regulations, for drinking water preparation, surface water cleanup, or waste water treatment.

Notification status**sodium hypochlorite, solution:**

Regulatory List	Notification	Notification number
INSQ	YES	
ONT INV	YES	
PHARM (JP)	YES	
PICCS (PH)	YES	
TCSI	YES	
TH INV	YES	2828.90
TH INV	YES	55-1-05972
TSCA	YES	
VN INVL	YES	

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

Regulatory List	Notification	Notification number
INSQ	YES	
ONT INV	YES	
PHARM (JP)	YES	
PICCS (PH)	YES	
TCSI	YES	
TH INV	YES	2815.11
TH INV	YES	2815.12
TH INV	YES	55-1-01354
TSCA	YES	
VN INVL	YES	

15.2. Chemical safety assessment

no data available

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.

Abbreviations and Acronyms

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
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level

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LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

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 the text.

|| Indicates updated section.

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	NA	ES9179
3	Use in cleaning agents	3	4	35	5, 7, 8a, 9, 10, 13	6b	NA	ES9191
4	Use in cleaning agents	22	NA	35	5, 9, 10, 11, 13, 15	8a, 8b, 8d, 8e	NA	ES538
5	Use in sewage water treatment	3	23	20, 37	1, 2, 3, 4, 5, 8a, 8b, 9	6b	NA	ES9187
6	Use in paper industry	3	6b	26	1, 2, 3, 4, 5, 8a, 8b, 9	6b	NA	ES9189
7	Use as an intermediate	3	8, 9	19	1, 2, 3, 4, 8a, 8b, 9	6a	NA	ES9182
8	Use in textile industry	3	5	34	1, 2, 3, 4, 5, 8a, 8b, 9, 13	6b	NA	ES9185
9	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
10	Consumer use	21	NA	34, 35, 37	NA	8a, 8b, 8d, 8e	NA	ES653

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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 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, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
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PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

	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
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 or 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

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, Relevant for all PROCs: 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
PROC1, PROC2, PROC3, PROC4	General exposures	worker - inhalation, short-term - local and systemic	0.540mg/m ³	0.1742
PROC1, PROC2, PROC3, PROC4	Laboratory activities	worker - inhalation, short-term - local and systemic	0.252mg/m ³	0.081
PROC1, PROC2, PROC3, PROC4	Equipment maintenance	worker - inhalation, short-term - local and systemic	0.480mg/m ³	0.155
PROC8a, PROC8b, PROC9	---	worker - inhalation, 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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

be necessary to define appropriate site-specific risk management measures.
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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

1. Short title of Exposure Scenario 2: 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
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, pelletisation</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 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,

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
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 m ³ /day
	Light activity	
Other operational conditions affecting workers exposure	Indoor or 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
Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15: EU RAR

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 - inhalation, short-term - local and systemic	0.540mg/m ³	0.1742
PROC1, PROC2, PROC3, PROC4, PROC5	Laboratory activities	worker - inhalation, short-term - local and systemic	0.252mg/m ³	0.081

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

PROC1, PROC2, PROC3, PROC4, PROC5	Equipment maintenance	worker - inhalation, short-term - local and systemic	0.480mg/m ³	0.155
PROC8a, PROC8b, PROC9	---	worker - inhalation, 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.
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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

1. Short title of Exposure Scenario 3: 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
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

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 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: PROC5, PROC7, PROC8a, PROC9, PROC10, PROC13

Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 25 %.
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PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

	Mixture/Article	
	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

PROC5, PROC7, PROC8a, PROC9, PROC10, PROC13: Advanced REACH Tool (ART model)

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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.

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
1. Short title of Exposure Scenario 4: 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 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
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, PROC13, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%
	Physical Form (at time of	Liquid, moderate fugacity

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

	use)	
	Vapour pressure	25 hPa
Frequency and duration of use	Exposure duration per day	8 h
	Frequency of use	5 days/week
Other operational conditions affecting workers exposure	Indoor or 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. The work place and work methods shall be organized in such a way that direct contact with the product is prevented or minimized.	
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 or 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	Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out overhead. The work place and work methods shall be organized in such a way that direct contact with the product is prevented or minimized.	
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

PROC11: EASE v2.0

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC11	---	Worker - inhalative, 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.

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

1. Short title of Exposure Scenario 5: 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 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

Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 25 %.
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PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

	Mixture/Article	
	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

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9: 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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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.

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.

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
1. Short title of Exposure Scenario 6: Use in paper industry

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products
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 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 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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9: 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.

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$ **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.

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.

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

1. Short title of Exposure Scenario 7: 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 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, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the	Covers percentage substance in the product up to
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PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

	Substance in Mixture/Article	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

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: 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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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.

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

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 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 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,

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
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 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

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13: 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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

PROC13	---	Worker - inhalative, long-term - local	0.70mg/m ³	0.45
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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.

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
1. Short title of Exposure Scenario 9: 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 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, pelletisation
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
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

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

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% - 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
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Air	Substance release to air can be excluded

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

releases to soil Organizational measures to prevent/limit release from the site	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 m ³ /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 or 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.

2.3 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 area	Two hands 820 cm ²

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

Other operational conditions affecting workers exposure	Indoor or 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

Relevant for all PROCs: 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 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.
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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$
1. Short title of Exposure Scenario 10: Consumer use

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	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 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)

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

PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	4 m ³
	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 area	Palm of one Hand 420 cm ²
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	4 m ³
	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: 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 area	Two hands 820 cm ²
Other given operational conditions affecting consumers exposure	Indoor use	
	Room size	4 m ³
	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		
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PURECHLOR / ULTRACHLOR ≥ 10 - $\leq 15\%$

Qualitative approach used to conclude safe use.

Consumers

PC34, PC35: EU RAR

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC34	Laundry bleaching/pre-treatment	Consumer - inhalative, long-term - systemic	1.68 $\mu\text{g}/\text{m}^3$	0.000108
PC35	Hard surface cleaning	Consumer - inhalative, long-term - systemic	1.68 $\mu\text{g}/\text{m}^3$	0.000108
PC34	Laundry bleaching/pre-treatment	Consumer - dermal, short-term - local	0.035mg/kg bw/day	< 1
PC35	Hard surface cleaning	Consumer - dermal, short-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

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