Trade name: Cuprous oxide, red

SDS no.: 004965

Current version : 4.1.0, issued: 12.09.2018 **Replaced version:** 4.0.4, issued: 13.06.2017 **Region:** GB

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

1.1 Product identifier

Trade name

Cuprous oxide, red

Substance name	dicopper oxide
REACH registration no.	01-2119513794-36

Identification numbers

CAS no.	1317-39-1
EC no.	215-270-7
Index no.	029-002-00-X

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

Relevant identified uses of the substance or mixture
Industrial use
antifouling additive

Uses advised against
No data available.

Reference to relevant exposure scenarios
For an overview of the exact titles of the relevant exposure scenarios please refer to section 16 of this SDS.

1.3 Details of the supplier of the safety data sheet

Address
ALTICHEM
4 RUE JACQUES VAUCANSON
P.A. DU VERT GALANT
95310 SAINT-OUEN-L'AUMÔNE
FRANCE

T 33 (0)1 34 40 12 80
F 33 (0)1 34 64 56 99
fds@altichem.com

1.4 Emergency telephone number

FR - N° ORFILA: +33 (0)1 45 42 59 59
UK - 0344 892 0111

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification in accordance with Regulation (EC) No 1272/2008 (CLP)
Acute Tox. 4; H302
Acute Tox. 4; H332
Aquatic Acute 1; H400
Aquatic Chronic 1; H410
Eye Dam. 1; H318

Note	Specific concentration limits	M-factor (acute)	M-factor (chronic)
-	-	M = 100	-

Classification information
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3 and 4 of Annex I to CLP.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)

Product identifier
1317-39-1 (dicopper oxide)

Hazard pictograms

GHS05 GHS07 GHS09

Signal word
Danger

Hazard statement(s)

H302+H332	Harmful if swallowed or if inhaled
H318	Causes serious eye damage.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor if you feel unwell.
P501	Dispose of contents/container to hazardous or special waste collection point.

2.3 Other hazards
No data available.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical characterization

Substance name	dicopper oxide

Identification numbers

CAS no.	1317-39-1
EC no.	215-270-7
Index no.	029-002-00-X

3.2 Mixtures
Not applicable. The product is not a mixture.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
In case of persisting adverse effects, consult a physician. Remove contaminated clothing and shoes immediately, and launder thoroughly before reusing. Poisonous symptoms can first be observed after several hours, therefore medical observation for at least 48 hours is necessary.

After inhalation
Remove affected person from the immediate area. Ensure supply of fresh air.

After skin contact
Wash off immediately with soap and water.

After eye contact
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.

After ingestion
Call a doctor immediately and show label or packaging. Rinse out mouth and give plenty of water to drink. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed
No data available.

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

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide; Extinguishing powder; Water spray jet; Extinguishing measures to suit surroundings.

Unsuitable extinguishing media
High power water jet

5.2 Special hazards arising from the substance or mixture
In the event of fire, the following can be released: Carbon dioxide (CO2); Carbon monoxide (CO)

5.3 Advice for firefighters
Fire-fighting operations, rescue and clearing work under effect of combustion and smoulder gases just may be done with breathing apparatus. Wear protective clothing. Product itself does not burn. Adapt extinguisher and fire-fighting measures to fire in the environment. Run-off water from fire fighting must not be discharged into drains or enter surface water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Refer to protective measures listed in sections 7 and 8. Ensure adequate ventilation. Avoid dust formation.

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions
Do not discharge into the drains/surface waters/groundwater. Do not discharge into the subsoil/soil.

6.3 Methods and material for containment and cleaning up
Take up mechanically. When picked up, treat material as prescribed under heading "Disposal considerations".

6.4 Reference to other sections
No data available.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Avoid the formation and deposition of dust. Provide good ventilation at the work area (local exhaust ventilation, if necessary).

General protective and hygiene measures
Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Wash hands before breaks and after work. Do not inhale dust. Provide eye wash fountain in work area.

Advice on protection against fire and explosion
No special measures necessary.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed in a cool, well-ventilated place.

Recommended storage temperature
Value 0 - 30 °C

Requirements for storage rooms and vessels
Store product in closed containers.

Advice on storage assembly
Do not store together with foodstuffs. Do not store together with acids.

7.3 Specific end use(s)

Industry solution
Always read the label and product information before use.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

DNEL, DMEL and PNEC values

DNEL values (worker)

No	Substance name			CAS / EC no	
	Route of exposure	Exposure time	Effect	Value	
1	**dicopper oxide**			**1317-39-1 215-270-7**	
	dermal			9566.9	mg/kg/day
	with reference to: solid				
	dermal			956.9	mg/kg/day
	with reference to: slurry				
	inhalative			1	mg/m³

PNEC values

No	Substance name		CAS / EC no	
	ecological compartment	Type	Value	
1	**dicopper oxide**		**1317-39-1 215-270-7**	
	water	fresh water	0.0078	mg Cu L-1
	water	fresh water sediment	87.1	mg Cu kg dwt-1
	water	marine water	0.0056	mg Cu L-1
	water	marine water sediment	676	mg Cu kg dwt-1
	soil	-	64.6	mg Cu kg dwt-1
	sewage treatment plant	-	0.23	mg Cu L-1

8.2 Exposure controls

Appropriate engineering controls
No data available.

Personal protective equipment

Respiratory protection
If workplace exposure limits are exceeded, a respiration protection approved for this particular job must be worn. In case of dust formation, take appropriate measures for breathing protection in the event workplace threshold values are not specified.
Respiratory filter (part): P2

Eye / face protection
Safety glasses (EN 166)

Hand protection
In case of intensive contact, wear protective gloves (EN 374). Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves. Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product.

Appropriate Material	PVC		
Breakthrough time	>	480	min

Other
Normal chemical work clothing.

Environmental exposure controls
No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form/Colour
Powder
red

Odour
slightly perceptible

Odour threshold
No data available

pH value
No data available

Boiling point / boiling range	
Remarks	Decomposes below boiling point.

Melting point / melting range	
Remarks	Decomposes before melting.

Decomposition point / decomposition range	
Value	332 °C
Method	EEC A1
Source	DAR

Flash point
Not applicable

Auto-ignition temperature	
Method	EEC A16
Remarks	Product is not selfigniting.

Oxidising properties
not oxidizing

Explosive properties
The product does not have explosive properties.

Flammability (solid, gas)
not flammable

Lower flammability or explosive limits
Not applicable

Upper flammability or explosive limits
Not applicable

Vapour pressure
Not relevant

Vapour density
Not relevant

Evaporation rate
Not applicable

Relative density			
Value	5.87		
Reference temperature	20	°C	
Method	EEC A3		

Density
No data available

Bulk density				
Value	1500	-	2000	kg/m³
Reference temperature	20			°C

Solubility in water	
Remarks	insoluble

Solubility(ies)
No data available

Partition coefficient: n-octanol/water
No data available

Viscosity
Not applicable

Solids content		
Value	100	%

9.2 Other information

Other information
No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available.

10.2 Chemical stability
No data available.

10.3 Possibility of hazardous reactions
No data available.

10.4 Conditions to avoid
None, if handled according to intended use.

10.5 Incompatible materials
Acids

10.6 Hazardous decomposition products
None, if handled according to intended use.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity					
No	**Substance name**	**CAS no.**		**EC no.**	
1	**dicopper oxide**	**1317-39-1**		**215-270-7**	
LD50	300	-	500		mg/kg bodyweight
Species	rat				
Method	OECD 423				
Source	DAR				

Acute dermal toxicity					
No	**Substance name**	**CAS no.**		**EC no.**	
1	**dicopper oxide**	**1317-39-1**		**215-270-7**	
LD50	>		2000		mg/kg bodyweight
Species	rat				
Method	OECD 402				
Source	GHS Classification Report				

Acute inhalational toxicity					
No	**Substance name**	**CAS no.**		**EC no.**	
1	**dicopper oxide**	**1317-39-1**		**215-270-7**	
LC50			3.34		mg/l
Duration of exposure			4		h
State of aggregation	Dust/mist				
Species	rat				
Method	OECD 403				
Source	DAR				

Skin corrosion/irritation			
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
Species	rabbit		
Method	OECD 404		
Evaluation	non-irritant		

Serious eye damage/irritation			
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
Species	rabbit		
Method	OECD 405		
Source	CSR		
Evaluation	Irreversible effects on the eye		

Respiratory or skin sensitisation			
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
Route of exposure	Skin		
Species Method Evaluation/classification	guinea pig OECD 406 Based on available data, the classification criteria are not met.		

Germ cell mutagenicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
with reference to	Copper substances are considered to be not mutagenic.		
Source	European Union Risk Assessment Report		

Reproduction toxicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
with reference to	Copper substances are considered to be not toxic to reproduction.		
Source	European Union Risk Assessment Report		

Carcinogenicity		
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
with reference to	Copper substances are considered to be not carcinogenic.
Source	European Union Risk Assessment Report

STOT - single exposure		
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
Source	GHS Classification Report
Evaluation/classification	Based on available data, the classification criteria are not met.

STOT - repeated exposure		
No	**Substance name**	**CAS no.**	**EC no.**
1	**dicopper oxide**	**1317-39-1**	**215-270-7**
Source	GHS Classification Report
Evaluation/classification	Based on available data, the classification criteria are not met.

Aspiration hazard
Not classified

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Inhalation of dusts may irritate the respiratory tract. Irritating to eyes.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**dicopper oxide**	**1317-39-1**		**215-270-7**
LC50		0.0081	mg/l
Duration of exposure		96	h
Species	Pimephales promelas		
Source	CLH report		

Toxicity to fish (chronic)
No data available

Toxicity to Daphnia (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**dicopper oxide**	**1317-39-1**		**215-270-7**
EC50		0.51	mg/l
Duration of exposure		48	h
Species	Daphnia magna		
Method	OECD 202		
Source	GHS Classification Report		

Toxicity to Daphnia (chronic)
No data available

Toxicity to algae (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**dicopper oxide**	**1317-39-1**		**215-270-7**
ErC50		65	mg/l
Duration of exposure		96	h
Species	Scenedesmus subspicatus		
Method	OECD 201		
Source	GHS Classification Report		

Toxicity to algae (chronic)
No data available

Bacteria toxicity
No data available

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

No data available.

12.6 Other adverse effects

No data available.

12.7 Other information

Other information
Do not allow to enter soil, waterways or waste water canal.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

Packaging

Residuals must be removed from packaging and when emptied completely disposed of in accordance with the regulations for waste removal. Incompletely emptied packaging must be disposed of in the form of disposal specified by the regional disposer.

SECTION 14: Transport information

14.1 Transport ADR/RID/ADN

Class	9
Classification code	M7
Packing group	III
Hazard identification no.	90
UN number	UN3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Technical name	dicopper oxide
Tunnel restriction code	-
Label	9
Environmentally hazardous substance mark	Symbol "fish and tree"

14.2 Transport IMDG

Class	9
Packing group	III
UN number	UN3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Technical name	dicopper oxide
EmS	F-A, S-F
Label	9
Marine pollutant mark	Symbol "fish and tree"

14.3 Transport ICAO-TI / IATA

Class	9
Packing group	III
UN number	UN3077
Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Technical name	dicopper oxide
Label	9
Environmentally hazardous substance mark	Symbol "fish and tree"

14.4 Other information

No data available.

14.5 Environmental hazards

Information on environmental hazards, if relevant, please see 14.1 - 14.3.

14.6 Special precautions for user

No data available.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not relevant

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)
In accordance with the Reach regulation (EC) 1907/2006, the product does not contain any substances that are considered as subject to listing in annex XIV, inventory of substances requiring authorisation.

REACH candidate list of substances of very high concern (SVHC) for authorisation
In accordance with article 57 and article 59 of the Reach regulation (EC) 1907/2006, this substance is not considered as subject to listing in annex XIV, inventory of substances requiring authorisation ("Authorization list").

Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, PREPARATIONS AND ARTICLES
The substance is not subject to the provisions of annex XVII (restriction entries) of the Reach regulation (EC) 1907/2006.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances	
This product is subject to Part I of Annex I, risk category:	E1

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

SECTION 16: Other information

Sources of key data used to compile the data sheet:
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
EC Directives 2000/39/EC, 2006/15/EC, 2009/161/EU
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

Full text of the H- and EUH- phrases drawn up in sections 2 and 3 (provided not already drawn up in these sections)

H302	Harmful if swallowed.
H332	Harmful if inhaled.
H400	Very toxic to aquatic life.

List of existing exposition scenarios

ES001	Formulation and (re)packing of substance and mixtures - industrial use
ES002	Formulation in materials - industrial use
ES003	Use in rubber production and processing - industriel use
ES004	Use as catalysts - industrial use

This information is based on our present knowledge and experience.
The safety data sheet describes products with a view to safety requirements.
It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

Alterations/supplements:
Alterations to the previous edition are marked in the left-hand margin.

SECTION 1: Title and scope of exposure scenario (ES)

1.1 Title exposure scenario (ES)

ES1 Formulation and (re)packing of substance and mixtures - industrial use

1.2 Scope of exposure scenario (ES)

ES Type	Worker Exposure Scenario for substance/mixture
Life cycle stage	Formulation

Product identifier

Trade name	Cuprous oxide, red
Substance name	dicopper oxide
REACH registration no.	01-2119513794-36
CAS no.	1317-39-1
EC no.	215-270-7

Use descriptors

Sector of use (SU)		
Category	Code	Use description
Main user group	SU3	Industrial uses
Environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC2	Formulation of preparations
Process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Other information

The information in this ES originate from the CSR.

SECTION 2: Operational conditions (OC) and risk management measures (RMM) controlling exposure towards environment and men

2.1 Product characteristics

State of aggregation		
solid		
Reference temperature	25	°C

Dustiness
medium

Vapour pressure
Not relevant

Other information
For further instructions related to "Personal protective equipment" please refer to section 8 of the Safety Data Sheet.
The efficiency of a risk management measure is a theoretical value. The efficiency describes to which extend (in percent) the calculated exposure can be diminished by applying a certain measure. If the described operational conditions and risk management measures are fulfilled by a downstream user, the efficiency as highlighted in the ES can be applied. A downstream user might check whether the efficiency of the LEV or general ventilation corresponds to his site.

2.2 Contributing scenario controlling environmental exposure

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC2	Formulation of preparations

Operational conditions controlling environmental exposure

daily quantity used on site			
	ERC2		
Value	18 kg/d		

Emission conditions			
	ERC2		
Type of emission	Continuous release		
Duration of emission	≤ 220 days/year		

Other information	
ERC2	The stated quantities refer only to the copper content in the assessed copper compound.

Risk management measures (RMM) controlling environmental exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
ERC2	Measures	Direct air emissions should be reduced by implementing one or more of the following technical measures: electrostatic precipitator, wet electrostatic precipitator, cyclone, fabric or bag filter, ceramic and metal mesh filter or wet scrubber.
	Efficiency (%)	99.6

Organisational measures	
ERC2	No special measures are required.

Measures related to wastewater treatment and efficiency of the risk managment measures (in exposure calculation model)		
ERC2	Measures	Ensure all waste water is collected and treated via a WWTP.
	Efficiency (%)	92

Measures related to waste treatment	
ERC2	Dispose of waste or used sacks/containers according to local regulations.

2.3 Contributing scenario controlling worker exposure

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Operational conditions controlling worker exposure

Concentration of substance								
	PROC1			PROC2			PROC3	
Value	≤	100	%	≤	100	%	≤ 100	%
	PROC4			PROC5			PROC8a	
Value	≤	100	%	≤	100	%	≤ 100	%
	PROC8b			PROC9			PROC14	
Value	≤	100	%	≤	100	%	≤ 100	%
	PROC26							
Value	≤	100	%					

Use conditions								
	PROC1			PROC2			PROC3	
Location of use	Indoor and outdoor use.			Indoor and outdoor use.			Indoor and outdoor use.	
Duration of use	≤	8	hours/day	≤	8	hours/day	≤ 8	hours/day
Frequency of use	≤	220	days/year	≤	220	days/year	≤ 220	days/year
	PROC4			PROC5			PROC8a	
Location of use	Indoor and outdoor use.			Indoor and outdoor use.			Indoor and outdoor use.	
Duration of use	≤	8	hours/day	≤	8	hours/day	≤ 8	hours/day
Frequency of use	≤	220	days/year	≤	220	days/year	≤ 220	days/year
	PROC8b			PROC9			PROC14	
Location of use	Indoor and outdoor use.			Indoor and outdoor use.			Indoor and outdoor use.	
Duration of use	≤	8	hours/day	≤	8	hours/day	≤ 8	hours/day
Frequency of use	≤	220	days/year	≤	220	days/year	≤ 220	days/year
	PROC26							
Location of use	Indoor and outdoor use.							
Duration of use	≤	8	hours/day					
Frequency of use	≤	220	days/year					

Risk management measures (RMM) controlling worker exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
PROC1	Measures	No special measures are required.
PROC2	Measures	No special measures are required.
PROC3	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC4	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC5	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8a	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8b	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	95
PROC9	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC14	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC26	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	78

Organisational measures
No special measures are required.

SECTION 3: Exposure estimation and reference to sources

3.1 Advice

The Risk Characterization Ratio (RCR) is the quotient of predicted human/environmental exposure and the related DNEL/PNEC. Exposure is calculated based on exposure models as stated below. If RCR ≤ 1 a use is considered as safe under operational conditions and risk management measures as specified in the exposure szenario.

For DNEL/PNEC values please refer to section 8 of the safety data sheet.

3.2 Exposure estimation - Environment

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC2	Formulation of preparations

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Risk characterisation ratio (RCR)			
	ERC2		
Microbiological activity in sewage treatment plants (STP)	0.160		
Freshwater	0.690		
Freshwater sediment	0.860		
Seawater	0.270		
Marine sediment	0.040		
Soil	0.680		
Risc determining compartment	Freshwater sediment		

3.3 Exposure estimation - Worker

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Risk characterisation ratio (RCR)				
	Exposure estimation	**inhalative**	**dermal**	**total**
PROC1	Long-term systemic	0.010	0.013	0.023
PROC2	Long-term systemic	0.500	0.025	0.525
PROC3	Long-term systemic	0.100	0.013	0.113
PROC4	Long-term systemic	0.500	0.025	0.525
PROC5	Long-term systemic	0.500	0.025	0.525
PROC8a	Long-term systemic	0.500	0.050	0.550
PROC8b	Long-term systemic	0.250	0.025	0.275
PROC9	Long-term systemic	0.500	0.025	0.525
PROC14	Long-term systemic	0.100	0.025	0.125
PROC26	Long-term systemic	0.720	0.103	0.823

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

4.1 Recommendations and advice

Recommendations and general advice

- For additional instructions relating to adaptation of conditions of use in view of a scaling, pls. see the VCI practice guide, part I, section 7.7. https://www.vci.de/Themen/Chemikaliensicherheit/REACH/Seiten/REACH-Praxisfuehrer.aspx

If a downstream user uses the substance/preparation differently than stated in the ES (different operational conditions and/or risk management measures), he has the possibility to vary certain parameters of the exposure assessment. With the help of easy calculations he can check whether he still operates under safe circumstances. This process is called Scaling.

- If the operational conditions and risk management measures regarding environmental exposure differ from the specifications given in the ES, the Downstream User can use the tool Metals EUSES IT for the necessary scaling: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool

Scaling advice

Type of ventilation

If the type of ventilation at the use site of a downstream user (DU) differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the type of ventilation exists. Following scaling factors (f) apply: General ventilation (< 3 air changes per hour) =1; good general ventilation (3 to 5 air changes per hour, corresponds to outdoor use) = 0,7; enhanced general ventilation (> 5 air changes per hour) = 0,3.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (type of ventilation stated in ES)
In the same manner a scaling for the efficiency of the local extract ventilation (LEV) can by applied.

Duration of use

If the duration of the use by a worker at a downstream user (DU) site differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the duration of use exist. Following scaling factors (f) apply: duration > 4 hours/day = 1; duration: 1-4 hours/day = 0,6; duration: 15 min/day – 1 hour/day = 0,2; duration < 15 min/day = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (duration in ES)

Concentration of the substance in the product

If the downstream user (DU) uses the substance in a different concentration than the one stated in the ES, a linear correlation between the RCR (Inhalation)and the RCR (dermal) and the concentration exists. Following scaling factors (f) apply: Concentration >25% =1; concentration >= 5% = 0,6; concentration >= 1% = 0,2; concentration < 1% = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (concentration in ES).

4.2 Exposure estimation - Environment

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Further input parameters used for environmental exposure estimation			
	ERC2		
Effluent discharge volume of STP	≥ 2000		
River flow rate	≥ 18000 m³/d		
Freshwater dilution factor	10		
Marine water dilution factor	100		
Emission factor air	0.004		
Emission factor water	0.02		

4.3 Exposure estimation - Worker

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Trade name: Cuprous oxide, red

SDS no.: 004965

Current version : 1.2.0, issued: 12.09.2018 **Replaced version:** 1.1.2, issued: 31.07.2017 **Region:** GB

SECTION 1: Title and scope of exposure scenario (ES)

1.1 Title exposure scenario (ES)

ES2 Formulation in materials - industrial use

1.2 Scope of exposure scenario (ES)

ES Type	Worker Exposure Scenario for substance/mixture
Life cycle stage	Formulation

Product identifier

Trade name	Cuprous oxide, red
Substance name	dicopper oxide
REACH registration no.	01-2119513794-36
CAS no.	1317-39-1
EC no.	215-270-7

Use descriptors

Sector of use (SU)		
Category	Code	Use description
Main user group	SU3	Industrial uses
Environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC3	Formulation in materials
Process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Other information

The information in this ES originate from the CSR.

SECTION 2: Operational conditions (OC) and risk management measures (RMM) controlling exposure towards environment and men

2.1 Product characteristics

State of aggregation		
solid		
Reference temperature	25	°C

Dustiness
medium

Vapour pressure
Not relevant

Other information
For further instructions related to "Personal protective equipment" please refer to section 8 of the Safety Data Sheet.
The efficiency of a risk management measure is a theoretical value. The efficiency describes to which extend (in percent) the calculated exposure can be diminished by applying a certain measure. If the described operational conditions and risk management measures are fulfilled by a downstream user, the efficiency as highlighted in the ES can be applied. A downstream user might check whether the efficiency of the LEV or general ventilation corresponds to his site.

2.2 Contributing scenario controlling environmental exposure

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC3	Formulation in materials

Operational conditions controlling environmental exposure

daily quantity used on site			
	ERC3		
Value	455 kg/d		

Emission conditions			
	ERC3		
Type of emission	Continuous release		
Duration of emission	≤ 220 days/year		

Other information	
ERC3	The stated quantities refer only to the copper content in the assessed copper compound.

Risk management measures (RMM) controlling environmental exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
ERC3	Measures	Direct air emissions should be reduced by implementing one or more of the following technical measures: electrostatic precipitator, wet electrostatic precipitator, cyclone, fabric or bag filter, ceramic and metal mesh filter or wet scrubber.
	Efficiency (%)	99.6

Organisational measures	
ERC3	No special measures are required.

Measures related to wastewater treatment and efficiency of the risk managment measures (in exposure calculation model)		
ERC3	Measures	Ensure all waste water is collected and treated via a WWTP.
	Efficiency (%)	92

Measures related to waste treatment	
ERC3	Dispose of waste or used sacks/containers according to local regulations.

2.3 Contributing scenario controlling worker exposure

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Operational conditions controlling worker exposure

Concentration of substance						
	PROC1		PROC2		PROC3	
Value	≤ 100	%	≤ 100	%	≤ 100	%
	PROC4		PROC5		PROC8a	
Value	≤ 100	%	≤ 100	%	≤ 100	%
	PROC8b		PROC9		PROC14	
Value	≤ 100	%	≤ 100	%	≤ 100	%
	PROC26					
Value	≤ 100	%				

Use conditions						
	PROC1		PROC2		PROC3	
Location of use	Indoor and outdoor use.		Indoor and outdoor use.		Indoor and outdoor use.	
Duration of use	≤ 8	hours/day	≤ 8	hours/day	≤ 8	hours/day
Frequency of use	≤ 220	days/year	≤ 220	days/year	≤ 220	days/year
	PROC4		PROC5		PROC8a	
Location of use	Indoor and outdoor use.		Indoor and outdoor use.		Indoor and outdoor use.	
Duration of use	≤ 8	hours/day	≤ 8	hours/day	≤ 8	hours/day
Frequency of use	≤ 220	days/year	≤ 220	days/year	≤ 220	days/year
	PROC8b		PROC9		PROC14	
Location of use	Indoor and outdoor use.		Indoor and outdoor use.		Indoor and outdoor use.	
Duration of use	≤ 8	hours/day	≤ 8	hours/day	≤ 8	hours/day
Frequency of use	≤ 220	days/year	≤ 220	days/year	≤ 220	days/year
	PROC26					
Location of use	Indoor and outdoor use.					
Duration of use	≤ 8	hours/day				
Frequency of use	≤ 220	days/year				

Risk management measures (RMM) controlling worker exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
PROC1	Measures	No special measures are required.
PROC2	Measures	No special measures are required.
PROC3	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC4	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC5	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8a	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8b	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	95
PROC9	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC14	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC26	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	78

Organisational measures
No special measures are required.

SECTION 3: Exposure estimation and reference to sources

3.1 Advice

The Risk Characterization Ratio (RCR) is the quotient of predicted human/environmental exposure and the related DNEL/PNEC. Exposure is calculated based on exposure models as stated below. If RCR ≤ 1 a use is considered as safe under operational conditions and risk management measures as specified in the exposure szenario.

For DNEL/PNEC values please refer to section 8 of the safety data sheet.

3.2 Exposure estimation - Environment

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC3	Formulation in materials

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Risk characterisation ratio (RCR)			
	ERC3		
Microbiological activity in sewage treatment plants (STP)	0.160		
Freshwater	0.690		
Freshwater sediment	0.860		
Seawater	0.270		
Marine sediment	0.040		
Soil	0.680		
Risc determining compartment	Freshwater sediment		

3.3 Exposure estimation - Worker

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation
	PROC26	Handling of solid inorganic substances at ambient temperature

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Risk characterisation ratio (RCR)				
	Exposure estimation	**inhalative**	**dermal**	**total**
PROC1	Long-term systemic	0.010	0.013	0.023
PROC2	Long-term systemic	0.500	0.025	0.525
PROC3	Long-term systemic	0.100	0.013	0.113
PROC4	Long-term systemic	0.500	0.025	0.525
PROC5	Long-term systemic	0.500	0.025	0.525
PROC8a	Long-term systemic	0.500	0.050	0.550
PROC8b	Long-term systemic	0.250	0.025	0.275
PROC9	Long-term systemic	0.500	0.025	0.525
PROC14	Long-term systemic	0.100	0.025	0.125
PROC26	Long-term systemic	0.720	0.103	0.823

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

4.1 Recommendations and advice

Recommendations and general advice

- For additional instructions relating to adaptation of conditions of use in view of a scaling, pls. see the VCI practice guide, part I, section 7.7. https://www.vci.de/Themen/Chemikaliensicherheit/REACH/Seiten/REACH-Praxisfuehrer.aspx
If a downstream user uses the substance/preparation differently than stated in the ES (different operational conditions and/or risk management measures), he has the possibility to vary certain parameters of the exposure assessment. With the help of easy calculations he can check whether he still operates under safe circumstances. This process is called Scaling.
- If the operational conditions and risk management measures regarding environmental exposure differ from the specifications given in the ES, the Downstream User can use the tool Metals EUSES IT for the necessary scaling: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool

Scaling advice

Type of ventilation

If the type of ventilation at the use site of a downstream user (DU) differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the type of ventilation exists. Following scaling factors (f) apply: General ventilation (< 3 air changes per hour) =1; good general ventilation (3 to 5 air changes per hour, corresponds to outdoor use) = 0,7; enhanced general ventilation (> 5 air changes per hour) = 0,3.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (type of ventilation stated in ES)
In the same manner a scaling for the efficiency of the local extract ventilation (LEV) can by applied.

Duration of use

If the duration of the use by a worker at a downstream user (DU) site differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the duration of use exist. Following scaling factors (f) apply: duration > 4 hours/day = 1; duration: 1-4 hours/day = 0,6; duration: 15 min/day – 1 hour/day = 0,2; duration < 15 min/day = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (duration in ES)

Concentration of the substance in the product

If the downstream user (DU) uses the substance in a different concentration than the one stated in the ES, a linear correlation between the RCR (Inhalation)and the RCR (dermal) and the concentration exists. Following scaling factors (f) apply: Concentration >25% =1; concentration >= 5% = 0,6; concentration >= 1% = 0,2; concentration < 1% = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (concentration in ES).

4.2 Exposure estimation - Environment

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Further input parameters used for environmental exposure estimation			
	ERC3		
Effluent discharge volume of STP	≥ 2000 m³/d		
River flow rate	≥ 18000 m³/d		
Freshwater dilution factor	10		
Marine water dilution factor	100		
Emission factor air	0.004		
Emission factor water	0.002		

4.3 Exposure estimation - Worker

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Trade name: Cuprous oxide, red

SDS no.: 004965

Current version : 1.2.0, issued: 12.09.2018 **Replaced version:** 1.1.2, issued: 31.07.2017 **Region:** GB

SECTION 1: Title and scope of exposure scenario (ES)

1.1 Title exposure scenario (ES)

ES3 Use in rubber production and processing - industriel use

1.2 Scope of exposure scenario (ES)

ES Type	Worker Exposure Scenario for substance/mixture
Life cycle stage	Industrial end use

Product identifier

Trade name	Cuprous oxide, red
Substance name	dicopper oxide
REACH registration no.	01-2119513794-36
CAS no.	1317-39-1
EC no.	215-270-7

Use descriptors

Sector of use (SU)		
Category	Code	Use description
Main user group	SU3	Industrial uses
Environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Process category (PROC)		
Category	Code	Use description
Process category (PROC)	PROC3	Use in closed batch process (synthesis or formulation)
	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation

Other information

The information in this ES originate from the CSR.

SECTION 2: Operational conditions (OC) and risk management measures (RMM) controlling exposure towards environment and men

2.1 Product characteristics

State of aggregation	
solid	
Reference temperature	25 °C

Dustiness
medium

Vapour pressure
Not relevant

Other information
For further instructions related to "Personal protective equipment" please refer to section 8 of the Safety Data Sheet.
The efficiency of a risk management measure is a theoretical value. The efficiency describes to which extend (in percent) the calculated exposure can be diminished by applying a certain measure. If the described operational conditions and risk management measures are fulfilled by a downstream user, the efficiency as highlighted in the ES can be applied. A downstream user might check whether the efficiency of the LEV or general ventilation corresponds to his site.

2.2 Contributing scenario controlling environmental exposure

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Operational conditions controlling environmental exposure

daily quantity used on site			
	ERC6d		
Value	18.6 t/d		

Emission conditions			
	ERC6d		
Type of emission	Continuous release		
Duration of emission	≤ 220 days/year		

Other information	
ERC6d	The stated quantities refer only to the copper content in the assessed copper compound.

Risk management measures (RMM) controlling environmental exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
ERC6d	Measures	Direct air emissions should be reduced by implementing one or more of the following technical measures: electrostatic precipitator, wet electrostatic precipitator, cyclone, fabric or bag filter, ceramic and metal mesh filter or wet scrubber.
	Efficiency (%)	99.6

Organisational measures	
ERC6d	No special measures are required.

Measures related to wastewater treatment and efficiency of the risk managment measures (in exposure calculation model)		
ERC6d	Measures	Ensure all waste water is collected and treated via a WWTP.
	Efficiency (%)	92

Measures related to waste treatment	
ERC6d	Dispose of waste or used sacks/containers according to local regulations.

2.3 Contributing scenario controlling worker exposure

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	PROC3	Use in closed batch process (synthesis or formulation)
	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation

Operational conditions controlling worker exposure

Concentration of substance			
	PROC3	PROC8a	PROC8b
Value	≤ 100 %	≤ 100 %	≤ 100 %
	PROC9	PROC14	
Value	≤ 100 %	≤ 100 %	

Use conditions			
	PROC3	PROC8a	PROC8b
Location of use	Indoor and outdoor use.	Indoor and outdoor use.	Indoor and outdoor use.
Duration of use	≤ 8 hours/day	≤ 8 hours/day	≤ 8 hours/day
Frequency of use	≤ 220 days/year	≤ 220 days/year	≤ 220 days/year
	PROC9	PROC14	
Location of use	Indoor and outdoor use.	Indoor and outdoor use.	
Duration of use	≤ 8 hours/day	≤ 8 hours/day	
Frequency of use	≤ 220 days/year	≤ 220 days/year	

Risk management measures (RMM) controlling worker exposure

Technical measures and efficiency of the risk management measures (in exposure calculation model)		
PROC3	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8a	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8b	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	95
PROC9	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC14	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90

Organisational measures
No special measures are required.

SECTION 3: Exposure estimation and reference to sources

3.1 Advice

The Risk Characterization Ratio (RCR) is the quotient of predicted human/environmental exposure and the related DNEL/PNEC. Exposure is calculated based on exposure models as stated below. If RCR ≤ 1 a use is considered as safe under operational conditions and risk management measures as specified in the exposure szenario.

For DNEL/PNEC values please refer to section 8 of the safety data sheet.

3.2 Exposure estimation - Environment

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Risk characterisation ratio (RCR)			
	ERC6d		
Microbiological activity in sewage treatment plants (STP)	0.160		
Freshwater	0.700		
Freshwater sediment	0.880		
Seawater	0.250		
Marine sediment	0.040		
Soil	0.770		
Risc determining compartment	Freshwater sediment		

3.3 Exposure estimation - Worker

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	PROC3	Use in closed batch process (synthesis or formulation)
	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)
	PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelettisation

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Risk characterisation ratio (RCR)				
	Exposure estimation	**inhalative**	**dermal**	**total**
PROC3	Long-term systemic	0.100	0.013	0.113
PROC8a	Long-term systemic	0.500	0.050	0.550
PROC8b	Long-term systemic	0.250	0.025	0.275
PROC9	Long-term systemic	0.500	0.025	0.525
PROC14	Long-term systemic	0.100	0.025	0.125

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

4.1 Recommendations and advice

Recommendations and general advice

- For additional instructions relating to adaptation of conditions of use in view of a scaling, pls. see the VCI practice guide, part I, section 7.7. https://www.vci.de/Themen/Chemikaliensicherheit/REACH/Seiten/REACH-Praxisfuehrer.aspx
If a downstream user uses the substance/preparation differently than stated in the ES (different operational conditions and/or risk management measures), he has the possibility to vary certain parameters of the exposure assessment. With the help of easy calculations he can check whether he still operates under safe circumstances. This process is called Scaling.
- If the operational conditions and risk management measures regarding environmental exposure differ from the specifications given in the ES, the Downstream User can use the tool Metals EUSES IT for the necessary scaling: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool

Scaling advice

Type of ventilation

If the type of ventilation at the use site of a downstream user (DU) differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the type of ventilation exists. Following scaling factors (f) apply: General ventilation (< 3 air changes per hour) =1; good general ventilation (3 to 5 air changes per hour, corresponds to outdoor use) = 0,7; enhanced general ventilation (> 5 air changes per hour) = 0,3.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (type of ventilation stated in ES)
In the same manner a scaling for the efficiency of the local extract ventilation (LEV) can by applied.

Duration of use

If the duration of the use by a worker at a downstream user (DU) site differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the duration of use exist. Following scaling factors (f) apply: duration > 4 hours/day = 1; duration: 1-4 hours/day = 0,6; duration: 15 min/day – 1 hour/day = 0,2; duration < 15 min/day = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (duration in ES)

Concentration of the substance in the product

If the downstream user (DU) uses the substance in a different concentration than the one stated in the ES, a linear correlation between the RCR (Inhalation)and the RCR (dermal) and the concentration exists. Following scaling factors (f) apply: Concentration >25% =1; concentration >= 5% = 0,6; concentration >= 1% = 0,2; concentration < 1% = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (concentration in ES).

4.2 Exposure estimation - Environment

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Further input parameters used for environmental exposure estimation			
	ERC6d		
Effluent discharge volume of STP	≥ 2000 m³/d		
River flow rate	≥ 18000 m³/d		
Freshwater dilution factor	10		
Marine water dilution factor	100		
Emission factor air	0.004		
Emission factor water	0.00005		

4.3 Exposure estimation - Worker

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Trade name: Cuprous oxide, red

SDS no.: 004965

Current version : 1.2.0, issued: 12.09.2018 **Replaced version:** 1.1.2, issued: 31.07.2017 **Region:** GB

SECTION 1: Title and scope of exposure scenario (ES)

1.1 Title exposure scenario (ES)

ES4 Use as catalysts - industrial use

1.2 Scope of exposure scenario (ES)

ES Type	Worker Exposure Scenario for substance/mixture
Life cycle stage	Industrial end use

Product identifier

Trade name	Cuprous oxide, red
Substance name	dicopper oxide
REACH registration no.	01-2119513794-36
CAS no.	1317-39-1
EC no.	215-270-7

Use descriptors

Sector of use (SU)		
Category	Code	Use description
Main user group	SU3	Industrial uses
Environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6b	Industrial use of reactive processing aids
Process category (PROC)		
Category	Code	Use description
Process category (PROC)	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
	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)
	PROC22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting

Other information

The information in this ES originate from the CSR.

SECTION 2: Operational conditions (OC) and risk management measures (RMM) controlling exposure towards environment and men

2.1 Product characteristics

State of aggregation	
solid	
Reference temperature	25 °C

Dustiness
medium

Vapour pressure
Not relevant

Other information
For further instructions related to "Personal protective equipment" please refer to section 8 of the Safety Data Sheet.
The efficiency of a risk management measure is a theoretical value. The efficiency describes to which extend (in percent) the calculated exposure can be diminished by applying a certain measure. If the described operational conditions and risk management measures are fulfilled by a downstream user, the efficiency as highlighted in the ES can be applied. A downstream user might check whether the efficiency of the LEV or general ventilation corresponds to his site.

2.2 Contributing scenario controlling environmental exposure

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6b	Industrial use of reactive processing aids

Operational conditions controlling environmental exposure

daily quantity used on site			
	ERC6b		
Value	19 kg/d		

Emission conditions			
	ERC6b		
Type of emission	Continuous release		
Duration of emission	≤ 220 days/year		

Other information	
ERC6b	The stated quantities refer only to the copper content in the assessed copper compound.

Risk management measures (RMM) controlling environmental exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)
No special measures are required.

Organisational measures	
ERC6b	No special measures are required.

Measures related to wastewater treatment and efficiency of the risk managment measures (in exposure calculation model)		
ERC6b	Measures	Ensure all waste water is collected and treated via a WWTP.
	Efficiency (%)	92

Measures related to waste treatment	
ERC6b	Dispose of waste or used sacks/containers according to local regulations.

2.3 Contributing scenario controlling worker exposure

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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
	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)
	PROC22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting

Operational conditions controlling worker exposure

Concentration of substance			
	PROC1	PROC2	PROC3
Value	≤ 100 %	≤ 100 %	≤ 100 %
	PROC4	PROC8b	PROC9
Value	≤ 100 %	≤ 100 %	≤ 100 %
	PROC22		
Value	≤ 100 %		

Use conditions			
	PROC1	PROC2	PROC3
Location of use	Indoor and outdoor use.	Indoor and outdoor use.	Indoor and outdoor use.
Duration of use	≤ 8 hours/day	≤ 8 hours/day	≤ 8 hours/day
Frequency of use	≤ 220 days/year	≤ 220 days/year	≤ 220 days/year
	PROC4	PROC8b	PROC9
Location of use	Indoor and outdoor use.	Indoor and outdoor use.	Indoor and outdoor use.
Duration of use	≤ 8 hours/day	≤ 8 hours/day	≤ 8 hours/day
Frequency of use	≤ 220 days/year	≤ 220 days/year	≤ 220 days/year
	PROC22		
Location of use	Indoor and outdoor use.		
Duration of use	≤ 8 hours/day		
Frequency of use	≤ 220 days/year		

Risk management measures (RMM) controlling worker exposure

Technical measures and efficiency of the risk managment measures (in exposure calculation model)		
PROC1	Measures	No special measures are required.
PROC2	Measures	No special measures are required.
PROC3	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC4	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC8b	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC9	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90
PROC22	Measures	Handle only at a place with local exhaust system (or another appropriate exhaust).
	Efficiency (%)	90

Organisational measures
No special measures are required.

SECTION 3: Exposure estimation and reference to sources

3.1 Advice

The Risk Characterization Ratio (RCR) is the quotient of predicted human/environmental exposure and the related DNEL/PNEC. Exposure is calculated based on exposure models as stated below. If RCR ≤ 1 a use is considered as safe under operational conditions and risk management measures as specified in the exposure szenario.

For DNEL/PNEC values please refer to section 8 of the safety data sheet.

3.2 Exposure estimation - Environment

Affected environmental release category (ERC)		
Category	Code	Use description
Environmental release category (ERC)	ERC6b	Industrial use of reactive processing aids

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Risk characterisation ratio (RCR)			
	ERC6b		
Microbiological activity in sewage treatment plants (STP)	0.200		
Freshwater	0.600		
Freshwater sediment	0.900		
Seawater	0.200		
Marine sediment	0.030		
Soil	0.400		
Risc determining compartment	Freshwater sediment		

3.3 Exposure estimation - Worker

Affected process category (PROC)		
Category	Code	Use description
Process category (PROC)	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
	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)
	PROC22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra

Risk characterisation ratio (RCR)				
	Exposure estimation	**inhalative**	**dermal**	**total**
PROC1	Long-term systemic	0.010	0.013	0.023
PROC2	Long-term systemic	0.500	0.025	0.525
PROC3	Long-term systemic	0.100	0.013	0.113
PROC4	Long-term systemic	0.500	0.025	0.525
PROC8b	Long-term systemic	0.250	0.025	0.275
PROC9	Long-term systemic	0.500	0.025	0.525
PROC22	Long-term systemic	0.700	0.103	0.813

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

4.1 Recommendations and advice

Recommendations and general advice

- For additional instructions relating to adaptation of conditions of use in view of a scaling, pls. see the VCI practice guide, part I, section 7.7. https://www.vci.de/Themen/Chemikaliensicherheit/REACH/Seiten/REACH-Praxisfuehrer.aspx

If a downstream user uses the substance/preparation differently than stated in the ES (different operational conditions and/or risk management measures), he has the possibility to vary certain parameters of the exposure assessment. With the help of easy calculations he can check whether he still operates under safe circumstances. This process is called Scaling.

- If the operational conditions and risk management measures regarding environmental exposure differ from the specifications given in the ES, the Downstream User can use the tool Metals EUSES IT for the necessary scaling: http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool

Scaling advice

Type of ventilation

If the type of ventilation at the use site of a downstream user (DU) differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the type of ventilation exists. Following scaling factors (f) apply: General ventilation (< 3 air changes per hour) =1; good general ventilation (3 to 5 air changes per hour, corresponds to outdoor use) = 0,7; enhanced general ventilation (> 5 air changes per hour) = 0,3.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (type of ventilation stated in ES)
In the same manner a scaling for the efficiency of the local extract ventilation (LEV) can by applied.

Duration of use

If the duration of the use by a worker at a downstream user (DU) site differs from the instructions in the ES, a linear correlation between the RCR (Inhalation) and the duration of use exist. Following scaling factors (f) apply: duration > 4 hours/day = 1; duration: 1-4 hours/day = 0,6; duration: 15 min/day – 1 hour/day = 0,2; duration < 15 min/day = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (duration in ES)

Concentration of the substance in the product

If the downstream user (DU) uses the substance in a different concentration than the one stated in the ES, a linear correlation between the RCR (Inhalation)and the RCR (dermal) and the concentration exists. Following scaling factors (f) apply: Concentration >25% =1; concentration >= 5% = 0,6; concentration >= 1% = 0,2; concentration < 1% = 0,1.
RCR (DU) = f(DU) * RCR (as stated in ES) / f (concentration in ES).

4.2 Exposure estimation - Environment

Used exposure estimation model for calculation of environmental exposure	
Used exposure estimation model	EUSES-Model
Link to exposure estimation tool	EUSES: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

Further input parameters used for environmental exposure estimation			
	ERC6b		
Effluent discharge volume of STP	≥ 2000 m³/d		
River flow rate	≥ 18000 m³/d		
Freshwater dilution factor	10		
Marine water dilution factor	100		
Emission factor air	0.001		
Emission factor water	0.05		

4.3 Exposure estimation - Worker

Used exposure estimation model for calculation of worker exposure	
Used exposure estimation model	MEASE ECETOC TRA
Link to exposure estimation tool	MEASE: http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php ECETOC: http://www.ecetoc.org/tra