

manganese dioxide

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

1.1. Product identifier

Product name	: manganese dioxide
Synonyms	: MnO ₂ rich material, cell mud, anode mud, MnO ₂ sludge, Pb Mn cell mud, manganese sludge, anode cleaning sludge; slimes and sludges, zinc sulfate electrolytic
Registration number REACH	: 01-2119467168-30-0000 (Nyrstar Belgium NV/SA) 01-2119467168-30-0003 (Nyrstar Budel BV) 01-2119467168-30-0006 (Nyrstar France SAS)
Product type REACH	: Transported isolated intermediate : On-site isolated intermediate
CAS number	: 69012-43-7
EC number	: 273-742-8

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

1.2.1 Relevant identified uses

Under Regulation (EC) No 1907/2006 the substance is defined as an on-site and transported isolated intermediate and must be used in correspondence to that status, including the application of strictly controlled conditions

Industrial use: manufacturing of chemicals

For further details concerning the management measures: see the attached annex

1.2.2 Uses advised against

No uses advised against known

1.3. Details of the supplier of the safety data sheet

Supplier of the safety data sheet

Nyrstar Belgium N.V. on behalf of Nyrstar Sales & Marketing A.G.

Zinkstraat 1
B-2490 Balen
☎ +32 14 44 95 00
☎ +32 14 81 05 31
infoSDS@nyrstar.com

Nyrstar Budel B.V. on behalf of Nyrstar Sales & Marketing A.G.

Hoofdstraat 1
6024 AA Budel-Dorplein
☎ +32 14 44 96 80
☎ +32 14 44 95 52
infoSDS@nyrstar.com

Nyrstar France S.A.S. on behalf of Nyrstar Sales & Marketing A.G.

Rue Jean Jacques Rousseau
F-59950 Aubry
☎ +32 14 44 96 80
☎ +33 3 27 88 39 48
infoSDS@nyrstar.com

Manufacturer of the product

Nyrstar Sales & Marketing SA
1 Rue de Jargonnant
CH-1207 Geneva
infoSDS@nyrstar.com

1.4. Emergency telephone number

24h/24h (Telephone advice: English, French, German, Dutch):

+32 14 58 45 45 (BIG)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

Class	Category	Hazard statements
Carc.	category 2	H351: Suspected of causing cancer.
Repr.	category 1A	H360: May damage fertility or the unborn child.

manganese dioxide

STOT RE	category 1	H372: Causes damage to organs (central nervous system, reproductive organs) through prolonged or repeated exposure if swallowed.
Acute Tox.	category 4	H332: Harmful if inhaled.
Acute Tox.	category 4	H302: Harmful if swallowed.
Aquatic Acute	category 1	H400: Very toxic to aquatic life.
Aquatic Chronic	category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2. Label elements



Signal word

H-statements

H351

Suspected of causing cancer.

H360

May damage fertility or the unborn child.

H372

Causes damage to organs (central nervous system, reproductive organs) through prolonged or repeated exposure if swallowed.

H302 + H332

Harmful if swallowed or if inhaled.

H410

Very toxic to aquatic life with long lasting effects.

P-statements

P280

Wear protective gloves, protective clothing and eye protection/face protection.

P260

Do not breathe dust.

P304 + P340

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P330

Rinse mouth.

P308 + P313

IF exposed or concerned: Get medical advice/attention.

P312

Call a POISON CENTER/doctor if you feel unwell.

Supplemental information

Restricted to professional users.

2.3. Other hazards

No other hazards known

SECTION 3: Composition/information on ingredients

3.1. Substances

Name REACH Registration No	CAS No EC No	Conc. (C)	Classification according to CLP	Note	Remark
zinc oxide	1314-13-2 215-222-5	0%<C<1%	Aquatic Acute 1; H400 Aquatic Chronic 1; H410	(1)(2)	Component
lead(II)sulfate	7446-14-2 231-198-9	2.93% <C<29.27%	Repr. 1A; H360Df Acute Tox. 4; H332 Acute Tox. 4; H302 STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	(1)(2)(10)	Component
manganese dioxide 01-2119452801-43	1313-13-9 215-202-6	55.36% <C<94.91%	Acute Tox. 4; H332 Acute Tox. 4; H302 STOT RE 2; H373	(1)(2)	Component
calcium sulfate 01-2119444918-26	7778-18-9 231-900-3	0%<C<4.85%		(2)	Component
strontium sulphate	7759-02-6 231-850-2	0%<C<5.24%			Component

(1) For H-statements in full: see heading 16

(2) Substance with a Community workplace exposure limit

(10) Subject to restrictions of Annex XVII of Regulation (EC) No. 1907/2006

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

General:

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

2 / 17

manganese dioxide

Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with laboured breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital.

After inhalation:

Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

After skin contact:

Rinse with water. Soap may be used. Take victim to a doctor if irritation persists.

After eye contact:

Rinse with water. Take victim to an ophthalmologist if irritation persists.

After ingestion:

Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Do not induce vomiting. Consult a doctor/medical service if you feel unwell.

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

4.2.1 Acute symptoms

After inhalation:

No effects known.

After skin contact:

No effects known.

After eye contact:

No effects known.

After ingestion:

Vomiting. Abdominal pain. Diarrhoea. Irritation of the gastric/intestinal mucosa.

4.2.2 Delayed symptoms

No effects known.

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

If applicable and available it will be listed below.

SECTION 5: Firefighting measures

The information in this section is a general description. If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

5.1. Extinguishing media

5.1.1 Suitable extinguishing media:

Adapt extinguishing media to the environment.

5.1.2 Unsuitable extinguishing media:

No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

On burning: release of harmful/irritant gases/vapours.

5.3. Advice for firefighters

5.3.1 Instructions:

Take account of environmentally hazardous firefighting water. Use water moderately and if possible collect or contain it.

5.3.2 Special protective equipment for fire-fighters:

Gloves. Safety glasses. Protective clothing. Reactivity hazard: compressed air/oxygen apparatus. Reactivity hazard: gas-tight suit. Dust cloud production: compressed air/oxygen apparatus. Heat/fire exposure: compressed air/oxygen apparatus.

SECTION 6: Accidental release measures

The information in this section is a general description. If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

6.1. Personal precautions, protective equipment and emergency procedures

Prevent dust cloud formation. No naked flames.

6.1.1 Protective equipment for non-emergency personnel

See heading 8.2

6.1.2 Protective equipment for emergency responders

Gloves. Safety glasses. Protective clothing. Reactivity hazard: compressed air/oxygen apparatus. Reactivity hazard: gas-tight suit. Dust cloud production: compressed air/oxygen apparatus.

Suitable protective clothing

See heading 8.2

6.2. Environmental precautions

Contain released product, pump into suitable containers. Plug the leak, cut off the supply. Dam up the solid spill. Knock down/dilute dust cloud with water spray. Take account of toxic/corrosive precipitation water. Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

Prevent dust cloud formation. Scoop solid spill into closing containers. Carefully collect the spill/leftovers. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

manganese dioxide

6.4. Reference to other sections

See heading 13.

SECTION 7: Handling and storage

The information in this section is a general description. If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

7.1. Precautions for safe handling

Avoid raising dust. Keep away from naked flames/heat. Observe very strict hygiene - avoid contact. Keep container tightly closed. Remove contaminated clothing immediately. Do not discharge the waste into the drain.

7.2. Conditions for safe storage, including any incompatibilities

7.2.1 Safe storage requirements:

Store in a dry area. Keep only in the original container. Store at ambient temperature. Meet the legal requirements.

7.2.2 Keep away from:

Heat sources, combustible materials, oxidizing agents, reducing agents, (strong) acids, organic materials.

7.2.3 Suitable packaging material:

No data available

7.2.4 Non suitable packaging material:

No data available

7.3. Specific end use(s)

If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 Occupational exposure

a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

EU

Inorganic lead and its compounds	Time-weighted average exposure limit 8 h (Binding occupational exposure limit value)	0.15 mg/m ³
----------------------------------	--	------------------------

Belgium

Calcium (sulfate de) (anhydrate, hemihydrate, dihydrate, gypse)	Time-weighted average exposure limit 8 h	10 mg/m ³
Manganèse et ses composés (en Mn)	Time-weighted average exposure limit 8 h	0.2 mg/m ³
Plomb inorg. (poussières et fumées) (en Pb)	Time-weighted average exposure limit 8 h	0.15 mg/m ³
Zinc (oxyde de) (fumées)	Time-weighted average exposure limit 8 h	2 mg/m ³
	Short time value	10 mg/m ³

The Netherlands

Calciumsulfaat	Time-weighted average exposure limit 8 h (Private occupational exposure limit value)	0.5 mg/m ³
Lood en anorg. verbindingen (rook en stof) (als Pb)	Time-weighted average exposure limit 8 h (Private occupational exposure limit value)	0.15 mg/m ³
Lood en anorganische loodverbindingen	Time-weighted average exposure limit 8 h (Private occupational exposure limit value)	0.15 mg/m ³
Mangaanverbindingen (als Mn)	Time-weighted average exposure limit 8 h (Private occupational exposure limit value)	1 mg/m ³
	Short time value (Private occupational exposure limit value)	3 mg/m ³
Zinkoxide (rook)	Time-weighted average exposure limit 8 h (Private occupational exposure limit value)	5 mg/m ³

France

Calcium (sulfate de)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	10 mg/m ³
Plomb métallique et composés, en Pb	Time-weighted average exposure limit 8 h (VRC: Valeur réglementaire contraignante)	0.1 mg/m ³
Zinc (oxyde de, fumées)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	5 mg/m ³
Zinc (oxyde de, poussières)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	10 mg/m ³

Germany

Blei und anorganischen Bleiverbindungen	Time-weighted average exposure limit 8 h (TRGS 505)	0.1 mg/m ³
Calciumsulfat	Time-weighted average exposure limit 8 h (TRGS 900)	6 mg/m ³
Mangan und seine anorganischen Verbindungen	Time-weighted average exposure limit 8 h (TRGS 900)	0.02 mg/m ³

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

4 / 17

manganese dioxide

Mangan und seine anorganischen Verbindungen	Time-weighted average exposure limit 8 h (TRGS 900)	0.2 mg/m ³
---	---	-----------------------

UK

Gypsum inhalable dust	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	10 mg/m ³
Gypsum respirable dust	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	4 mg/m ³
Lead other than lead alkyls	Time-weighted average exposure limit 8 h (Occupational exposure limit (Control of lead at work))	0.15 mg/cm ³
Manganese inorganic compounds (as Mn)	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	0.5 mg/m ³

USA (TLV-ACGIH)

Calcium sulfate	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	10 mg/m ³ (I)
Lead, inorganic compounds, as Pb	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	0.05 mg/m ³
Manganese, inorganic compounds, as Mn	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	0.02 mg/m ³ (R)
	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	0.1 mg/m ³ (I)
Zinc oxide	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	2 mg/m ³ (R)
	Short time value (TLV - Adopted Value)	10 mg/m ³ (R)

(I): Inhalable fraction

(R): Respirable fraction

b) National biological limit values

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods

If applicable and available it will be listed below.

Lead	OSHA	ID 121
Lead	OSHA	ID 125G
Sulfites, & Sulfates	NIOSH	6004
Zinc (Elements)	NIOSH	7300
Zinc Oxide	NIOSH	7030
Zinc Oxide	NIOSH	7502
Zinc Oxide	OSHA	ID 121

8.1.3 Applicable limit values when using the substance or mixture as intended

If limit values are applicable and available these will be listed below.

8.1.4 DNEL/PNEC values

DNEL/DMEL - Workers

zinc oxide

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term local effects inhalation	0.5 mg/m ³	
	Long-term systemic effects inhalation	5 mg/m ³	
	Long-term systemic effects dermal	83 mg/kg bw/day	

manganese dioxide

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	0.06 mg/m ³	
	Long-term systemic effects dermal	0.004 mg/kg bw/day	

calcium sulfate

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Acute systemic effects inhalation	5082 mg/m ³	
	Long-term systemic effects inhalation	21.17 mg/m ³	

DNEL/DMEL - General population

zinc oxide

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	2.5 mg/m ³	
	Long-term systemic effects dermal	83 mg/kg bw/day	
	Long-term systemic effects oral	0.83 mg/kg bw/day	

manganese dioxide

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	0.043 mg/m ³	
	Long-term systemic effects dermal	0.002 mg/kg bw/day	

calcium sulfate

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Acute systemic effects inhalation	3811 mg/m ³	
	Acute systemic effects oral	11.4 mg/kg bw/day	
	Long-term systemic effects inhalation	5.29 mg/m ³	
	Long-term systemic effects oral	1.52 mg/kg bw/day	

PNEC

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

5 / 17

manganese dioxide

zinc oxide

Compartments	Value	Remark
Fresh water	20.6 µg/l	
Marine water	6.1 µg/l	
STP	100 µg/l	
Fresh water sediment	117.8 mg/kg sediment dw	
Marine water sediment	56.5 mg/kg sediment dw	
Soil	35.6 mg/kg soil dw	

manganese dioxide

Compartments	Value	Remark
Fresh water	0 mg/l	
Marine water	0 mg/l	
Aqua (intermittent releases)	0.001 mg/l	
STP	100 mg/l	
Fresh water sediment	0.037 mg/kg sediment dw	
Marine water sediment	0.004 mg/kg sediment dw	
Soil	0.028 mg/kg soil dw	

calcium sulfate

Compartments	Value	Remark
STP	100 mg/l	

8.1.5 Control banding

If applicable and available it will be listed below.

8.2. Exposure controls

The information in this section is a general description. If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

8.2.1 Appropriate engineering controls

Avoid raising dust. Keep away from naked flames/heat. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

8.2.2 Individual protection measures, such as personal protective equipment

Observe very strict hygiene - avoid contact. Keep container tightly closed. Do not eat, drink or smoke during work.

a) Respiratory protection:

Dust production: dust mask with filter type P3. High dust production: self-contained breathing apparatus.

b) Hand protection:

Gloves.

- materials (good resistance)

Butyl rubber, chlorinated polyethylene, nitrile rubber, neoprene, PVC, chlorinated polyethylene.

c) Eye protection:

Safety glasses. In case of dust production: protective goggles.

d) Skin protection:

Protective clothing. Dustproof clothing.

8.2.3 Environmental exposure controls:

See headings 6.2, 6.3 and 13

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical form	Solid
Odour	Odourless
Odour threshold	Not applicable
Colour	Grey to brown-black
Particle size	929 nm ; Median particle size D80 = 2083 nm
Explosion limits	No data available
Flammability	Non combustible
Log Kow	Not applicable (mixture)
Dynamic viscosity	No data available
Kinematic viscosity	No data available
Melting point	193 °C ; 1013 hPa ; EU Method A.1
Boiling point	No data available
Flash point	Not applicable
Evaporation rate	No data available
Relative vapour density	Not applicable
Vapour pressure	Not applicable
Solubility	water ; 28 mg/l ; 20 °C ; OECD 105
Relative density	4.1 ; 22 °C ; EU Method A.3
Decomposition temperature	193 °C
Auto-ignition temperature	Not applicable

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

6 / 17

manganese dioxide

Explosive properties	No chemical group associated with explosive properties
Oxidising properties	No chemical group associated with oxidising properties
pH	2.28 - 2.32 ; 28 mg/l ; 20 °C ; OECD 105

9.2. Other information

Surface tension	No data available
Absolute density	4090 kg/m ³ ; 22 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reacts with many compounds: (increased) risk of fire/explosion. Reacts with (some) acids: release of toxic and corrosive gases/vapours.

10.4. Conditions to avoid

Avoid raising dust. Keep away from naked flames/heat.

10.5. Incompatible materials

Combustible materials, oxidizing agents, reducing agents, (strong) acids, organic materials.

10.6. Hazardous decomposition products

No data available.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

11.1.1 Test results

Acute toxicity

manganese dioxide

No (test)data available

zinc oxide

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	Equivalent to OECD 401	> 5000 mg/kg		Rat (male/female)	Experimental value	
Dermal	LD50	OECD 402	> 2000 mg/kg bw	24 h	Rat (male/female)	Experimental value	
Inhalation (dust)	LC50	Equivalent to OECD 403	> 5.7 mg/l	4 h	Rat (male/female)	Experimental value	

lead(II)sulfate

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral			category 4			Annex VI	
Inhalation			category 4			Annex VI	

manganese dioxide

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral (drinking water)	LD50		> 3140 mg/kg bw		Rat (male)	Inconclusive, insufficient data	
Oral			category 4			Annex VI	
Inhalation						Data waiving	
Inhalation			category 4			Annex VI	

calcium sulfate

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	OECD 420	> 1584 mg/kg bw		Rat (female)	Experimental value	
Inhalation (dust)	LC50	OECD 403	> 2.61 mg/l air	4 h	Rat (male/female)	Experimental value	

Conclusion

Harmful if swallowed.

Harmful if inhaled.

Not classified as acute toxic in contact with skin

Corrosion/irritation

manganese dioxide

No (test)data available

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

7 / 17

manganese dioxide

zinc oxide

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Not irritating	OECD 405	24 h	24; 72 hours	Rabbit	Experimental value	
Skin	Not irritating	OECD 404	24 h	24 hours	Rabbit	Experimental value	
Not applicable (in vitro test)	Not corrosive	OECD 431	3 minutes	24; 72 hours	Reconstructed human epidermis	Experimental value	

calcium sulfate

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Not irritating	OECD 405		72 hours	Rabbit	Experimental value	
Skin	Not irritating	OECD 404	4 h	72 hours	Rabbit	Experimental value	

Conclusion

Not classified as irritating to the skin

Not classified as irritating to the eyes

Not classified as irritating to the respiratory system

Respiratory or skin sensitisation

manganese dioxide

No (test) data available

zinc oxide

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing	OECD 406			Guinea pig (female)	Experimental value	
Skin	Not sensitizing	Human observation	2 days	72 hours	Human	Experimental value	

calcium sulfate

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing	OECD 406	6 h	24; 48 hours	Guinea pig (male)	Experimental value	

Conclusion

Not classified as sensitizing for skin

Not classified as sensitizing for inhalation

Specific target organ toxicity

manganese dioxide

No (test) data available

zinc oxide

Route of exposure	Parameter	Method	Value	Organ	Effect	Exposure time	Species	Value determination
Oral (diet)	NOEL	OECD 408	3000 ppm		No effect	13 weeks (daily)	Rat (male/female)	Read-across
Inhalation (aerosol)	NOAEL	OECD 413	1.5 mg/m ³ air		No effect	13 weeks (6h/day, 5 days/week)	Rat (male)	Experimental value

lead(II)sulfate

Route of exposure	Parameter	Method	Value	Organ	Effect	Exposure time	Species	Value determination
Oral			STOT RE cat.2					Annex VI
Dermal			STOT RE cat.2					Annex VI
Inhalation			STOT RE cat.2					Annex VI

manganese dioxide

Route of exposure	Parameter	Method	Value	Organ	Effect	Exposure time	Species	Value determination
Inhalation		Human observation study			neurotoxic effects		Human	Experimental value
Inhalation			STOT RE cat.2	Brain	Brain affection			Expert

calcium sulfate

Route of exposure	Parameter	Method	Value	Organ	Effect	Exposure time	Species	Value determination
Oral	NOAEL	OECD 422	79 mg/kg bw/day	Blood	No effect	35 day(s)	Rat (male)	Experimental value
Oral	LOAEL	OECD 422	237 mg/kg bw/day	Blood	Change in the haemogramme/ blood composition	35 day(s)	Rat (male)	Experimental value

Conclusion

Causes damage to organs (central nervous system, reproductive organs) through prolonged or repeated exposure if swallowed.

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

8 / 17

manganese dioxide

Mutagenicity (in vitro)

manganese dioxide

No (test)data available

zinc oxide

Result	Method	Test substrate	Effect	Value determination
Negative with metabolic activation, negative without metabolic activation	Equivalent to OECD 471	Bacteria (S.typhimurium)	No effect	Experimental value

lead(II)sulfate

Result	Method	Test substrate	Effect	Value determination
Negative	Ames test			Experimental value
Ambiguous				Experimental value

calcium sulfate

Result	Method	Test substrate	Effect	Value determination
Negative with metabolic activation, negative without metabolic activation	OECD 471	Bacteria (S.typhimurium)	No effect	Experimental value
Negative with metabolic activation, negative without metabolic activation	OECD 471	Escherichia coli	No effect	Experimental value
Negative with metabolic activation, negative without metabolic activation	OECD 476	Mouse (lymphoma L5178Y cells)	No effect	Experimental value

Mutagenicity (in vivo)

manganese dioxide

No (test)data available

zinc oxide

Result	Method	Exposure time	Test substrate	Organ	Value determination
Negative	OECD 474		Mouse (male)	Bone marrow	Experimental value

calcium sulfate

Result	Method	Exposure time	Test substrate	Organ	Value determination
Negative	OECD 474		Mouse (male)	Blood	Experimental value

Carcinogenicity

manganese dioxide

No (test)data available

calcium sulfate

Route of exposure	Parameter	Method	Value	Exposure time	Species	Effect	Organ	Value determination
Oral	NOAEL	Other	256 mg/kg bw/day	104 weeks (daily)	Rat (male)	No effect		Experimental value
Oral	NOAEL	Other	284 mg/kg bw/day	104 weeks (daily)	Rat (female)	No effect		Experimental value

Reproductive toxicity

manganese dioxide

No (test)data available

zinc oxide

	Parameter	Method	Value	Exposure time	Species	Effect	Organ	Value determination
Developmental toxicity	NOAEC	OECD 414	7.5 mg/kg bw/day	14 days (6h/day)	Rat	No effect	Foetus	Experimental value
Maternal toxicity	NOAEC	OECD 414	7.5 mg/kg bw/day	14 days (6h/day)	Rat	No effect		Experimental value
Effects on fertility	NOAEL (F1)	Equivalent to OECD 416	7.5 mg/kg bw/day	22 weeks (daily)	Rat (male/female)	No effect		Read-across

lead(II)sulfate

	Parameter	Method	Value	Exposure time	Species	Effect	Organ	Value determination
Developmental toxicity			category 1A					Annex VI
Effects on fertility			category 2					Annex VI

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

9 / 17

manganese dioxide

calcium sulfate

	Parameter	Method	Value	Exposure time	Species	Effect	Organ	Value determination
Developmental toxicity	NOAEL	Equivalent to OECD 414	1600 mg/kg bw/day	10 day(s)	Mouse	No effect	General	Experimental value
	NOAEL	Equivalent to OECD 414	1600 mg/kg bw/day	10 day(s)	Rat	No effect	General	Experimental value
	NOAEL	Equivalent to OECD 414	1600 mg/kg bw/day	13 day(s)	Rabbit	No effect	General	Experimental value
Effects on fertility	NOAEL	OECD 422	790 mg/kg bw/day	2 week(s)	Rat (male/female)	No effect		Experimental value

Conclusion CMR

Suspected of causing cancer.

May damage the unborn child. Suspected of damaging fertility.

Not classified for mutagenic or genotoxic toxicity

Toxicity other effects

manganese dioxide

No (test) data available

Chronic effects from short and long-term exposure

manganese dioxide

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Feeling of weakness. Loss of appetite. Loss of weight. Sleeplessness. Brain affection. Behavioural disturbances. Delusions. Disturbed tactile sensibility. Movement disturbances. Coordination disorders. Disturbed motor response. Tremor. Coughing. Respiratory difficulties. Risk of pneumonia. Change in the haemogramme/blood composition. Impairment of the blood forming system. Possible premature birth. Discolouration of the gums.

SECTION 12: Ecological information

12.1. Toxicity

manganese dioxide

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity invertebrates	LC50	US EPA	73.56 µg/l	48 h	Ceriodaphnia dubia	Semi-static system	Fresh water	Read-across
Long-term toxicity fish	EC10		17.8 µg/l	7 day(s)	Cyprinus carpio	Flow-through system	Fresh water	Read-across

zinc oxide

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50	ASTM E729-88	0.169 mg/l	96 h	Oncorhynchus mykiss	Static system	Fresh water	Read-across; Zinc ion
Acute toxicity invertebrates	EC50	OECD 202	1 mg/l	48 h	Daphnia magna	Static system	Fresh water	Experimental value; Zinc ion
Toxicity algae and other aquatic plants	IC50	OECD 201	0.136 mg/l	72 h	Pseudokirchneriella subcapitata	Static system	Fresh water	Experimental value; Zinc ion
	NOEC	OECD 201	0.024 mg/l	3 day(s)	Pseudokirchneriella subcapitata	Static system	Fresh water	Experimental value; Zinc ion
Long-term toxicity fish	NOEC	OECD 215	0.039 mg/l	30 day(s)	Oncorhynchus mykiss	Flow-through system	Fresh water	Read-across; Zinc ion
Long-term toxicity aquatic invertebrates	NOEC	OECD 211	0.04 mg/l	21 day(s)	Daphnia magna	Semi-static system	Fresh water	Read-across; Zinc ion
Toxicity aquatic micro-organisms	EC50	OECD 209	> 1000 mg/l	3 h	Activated sludge	Static system	Fresh water	Experimental value; GLP

lead(II)sulfate

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	TLm		7.48 mg/l	96 h	Pimephales promelas			Literature study; Lead ion
Acute toxicity invertebrates	LC50		0.3 mg/l	48 h	Daphnia magna			Literature study; Lead ion
Toxicity algae and other aquatic plants	EC50		0.14 mg/l		Selenastrum capricornutum			Literature study; Lead ion

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

10 / 17

manganese dioxide

manganese dioxide

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50	OECD 203	> 100 %	96 h	Oncorhynchus mykiss	Semi-static system	Fresh water	Experimental value; Saturated solution
Acute toxicity invertebrates	EC50	OECD 202	> 0.073 mg/l	48 h	Daphnia magna	Static system	Fresh water	Experimental value; GLP
Toxicity algae and other aquatic plants	ErC50	OECD 201	> 100 %	72 h	Desmodesmus subspicatus	Static system	Fresh water	Experimental value; Saturated solution
Long-term toxicity fish								Data waiving
Long-term toxicity aquatic invertebrates	NOEC	OECD 211	10 %	8 day(s)	Ceriodaphnia dubia	Static system	Fresh water	Experimental value; Saturated solution
Toxicity aquatic micro-organisms	EC50	OECD 209	> 1000 mg/l	3 h	Activated sludge	Static system	Fresh water	Experimental value; GLP
Toxicity sediment organisms								Data waiving

	Parameter	Method	Value	Duration	Species	Value determination
Toxicity soil macro-organisms						Data waiving
Toxicity soil micro-organisms						Data waiving
Toxicity terrestrial plants						Data waiving
Toxicity other terrestrial organisms						Data waiving
Toxicity birds						Data waiving

calcium sulfate

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50		2980 mg/l	96 h	Lepomis macrochirus			

Classification is based on the relevant ingredients

Conclusion

Very toxic to aquatic life with long lasting effects.

12.2. Persistence and degradability

manganese dioxide

Biodegradation water

Method	Value	Duration	Value determination
			Data waiving

Conclusion

Biodegradability: not applicable

12.3. Bioaccumulative potential

manganese dioxide

Log Kow

Method	Remark	Value	Temperature	Value determination
	Not applicable (mixture)			

zinc oxide

Log Kow

Method	Remark	Value	Temperature	Value determination
		1.53		Estimated value

lead(II)sulfate

Log Kow

Method	Remark	Value	Temperature	Value determination
		1.13		Estimated value

manganese dioxide

BCF other aquatic organisms

Parameter	Method	Value	Duration	Species	Value determination
					Data waiving

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available			

calcium sulfate

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available			

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

11 / 17

manganese dioxide

strontium sulphate

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available			

Conclusion

No straightforward conclusion can be drawn based upon the available numerical values

12.4. Mobility in soil

zinc oxide

(log) Koc

Parameter	Method	Value	Value determination
log Koc		2.2	Literature study

Conclusion

Contains component(s) that adsorb(s) into the soil
Contains component(s) with potential for mobility in the soil

12.5. Results of PBT and vPvB assessment

The criteria of PBT and vPvB as listed in Annex XIII of Regulation (EC) No 1907/2006 do not apply to inorganic substances.

12.6. Other adverse effects

manganese dioxide

Fluorinated greenhouse gases (Regulation (EU) No 517/2014)

None of the known components is included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014)

Ozone-depleting potential (ODP)

Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009)

zinc oxide

Ground water

Ground water pollutant

SECTION 13: Disposal considerations

The information in this section is a general description. If available, the documentation for isolated intermediates will be attached in annex to support safe handling arrangements.

13.1. Waste treatment methods

13.1.1 Provisions relating to waste

Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014.

Waste material code (Directive 2008/98/EC, Decision 2000/0532/EC).

06 03 13* (wastes from the MFSU of salts and their solutions and metallic oxides: solid salts and solutions containing heavy metals). Depending on branch of industry and production process, also other waste codes may be applicable.

13.1.2 Disposal methods

Recycle/reuse. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste.

Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Do not discharge into surface water (Directive 2000/60/EC, Council Decision 2455/2001/EC). Treat using the best available techniques before discharge into drains or the aquatic environment.

13.1.3 Packaging/Container

Waste material code packaging (Directive 2008/98/EC).

15 01 10* (packaging containing residues of or contaminated by dangerous substances).

SECTION 14: Transport information

Road (ADR)

14.1. UN number

UN number	3077
-----------	------

14.2. UN proper shipping name

Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (lead(II)sulfate)
----------------------	--

14.3. Transport hazard class(es)

Hazard identification number	90
Class	9
Classification code	M7

14.4. Packing group

Packing group	III
Labels	9

14.5. Environmental hazards

Environmentally hazardous substance mark	yes
--	-----

14.6. Special precautions for user

Special provisions	274
Special provisions	335

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

12 / 17

manganese dioxide

Special provisions	375
Special provisions	601
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)

Rail (RID)

14.1. UN number	
UN number	3077
14.2. UN proper shipping name	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (lead(II)sulfate)
14.3. Transport hazard class(es)	
Hazard identification number	90
Class	9
Classification code	M7
14.4. Packing group	
Packing group	III
Labels	9
14.5. Environmental hazards	
Environmentally hazardous substance mark	yes
14.6. Special precautions for user	
Special provisions	274
Special provisions	335
Special provisions	375
Special provisions	601
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)

Inland waterways (ADN)

14.1. UN number	
UN number	3077
14.2. UN proper shipping name	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (lead(II)sulfate)
14.3. Transport hazard class(es)	
Class	9
Classification code	M7
14.4. Packing group	
Packing group	III
Labels	9
14.5. Environmental hazards	
Environmentally hazardous substance mark	yes
14.6. Special precautions for user	
Special provisions	274
Special provisions	335
Special provisions	375
Special provisions	601
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)

Sea (IMDG/IMSBC)

14.1. UN number	
UN number	3077
14.2. UN proper shipping name	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (lead(II)sulfate)
14.3. Transport hazard class(es)	
Class	9
14.4. Packing group	
Packing group	III
Labels	9
14.5. Environmental hazards	
Marine pollutant	P
Environmentally hazardous substance mark	yes
14.6. Special precautions for user	
Special provisions	274
Special provisions	335
Special provisions	966
Special provisions	967
Special provisions	969
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)

manganese dioxide

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

Annex II of MARPOL 73/78	Not applicable
--------------------------	----------------

Air (ICAO-TI/IATA-DGR)

14.1. UN number

UN number	3077
-----------	------

14.2. UN proper shipping name

Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (lead(II)sulfate)
----------------------	--

14.3. Transport hazard class(es)

Class	9
-------	---

14.4. Packing group

Packing group	III
Labels	9

14.5. Environmental hazards

Environmentally hazardous substance mark	yes
--	-----

14.6. Special precautions for user

Special provisions	A97
Special provisions	A158
Special provisions	A179
Special provisions	A197
Passenger and cargo transport: limited quantities: maximum net quantity per packaging	30 kg G

SECTION 15: Regulatory information

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

European legislation:

VOC content Directive 2010/75/EU

VOC content	Remark
	Not applicable (inorganic)

European drinking water standards (Directive 98/83/EC)

lead(II)sulfate

Parameter	Parametric value	Note	Reference
Lead	10 µg/l		Listed in Annex I, Part B, of Directive 98/83/EC on the quality of water intended for human consumption.
Sulphate	250 mg/l		Listed in Annex I, Part C, of Directive 98/83/EC on the quality of water intended for human consumption.

calcium sulfate

Parameter	Parametric value	Note	Reference
Sulphate	250 mg/l		Listed in Annex I, Part C, of Directive 98/83/EC on the quality of water intended for human consumption.

REACH registration

This substance is handled under Strictly Controlled Conditions in accordance with Reach regulation Article 17(3) for on-site isolated intermediates and, in case the substance is transported to other sites for further processing, the substance should be handled at these sites under Strictly Controlled Conditions as specified in Reach regulation Article 18(4). Site documentation to support safe handling arrangements including the selection of engineering, administrative and personal protective equipment controls in accordance with risk based management systems is available at each manufacturing site. Written confirmation of application of Strictly Controlled Conditions should be available at the premises of every affected Distributor and Downstream Processor/User of the Registrants' intermediate.

Information exposure scenarios

This safety data sheet does not contain an exposure scenario; exempted as (isolated) intermediate

REACH Annex XVII - Restriction

Contains component(s) subject to restrictions of Annex XVII of Regulation (EC) No 1907/2006: restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

	Designation of the substance, of the group of substances or of the mixture	Conditions of restriction
· lead(II)sulfate	Lead sulphates; PbSO 4	Shall not be placed on the market, or used, as substances or in mixtures, where the substance or mixture is intended for use as paint. However, Member States may, in accordance with the provisions of International Labour Organization (ILO) Convention 13, permit the use on their territory of the substance or mixture for the restoration and maintenance of works of art and historic buildings and their interiors, as well as the placing on the market for such use. Where a Member State makes use of this derogation, it shall inform the Commission thereof.
· lead(II)sulfate	Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as toxic to reproduction category 1A or 1B (Table 3.1) or toxic to reproduction category 1 or 2 (Table 3.2) and listed as follows: - Reproductive toxicant category 1A adverse	Without prejudice to the other parts of this Annex the following shall apply to entries 28 to 30:1. Shall not be placed on the market, or used, — as substances, — as constituents of other substances, or, — in mixtures, for supply to the general public when the individual concentration in the substance or

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

14 / 17

manganese dioxide

	<p>effects on sexual function and fertility or on development (Table 3.1) or reproductive toxicant category 1 with R60 (May impair fertility) or R61 (May cause harm to the unborn child) (Table 3.2) listed in Appendix 5 - Reproductive toxicant category 1B adverse effects on sexual function and fertility or on development (Table 3.1) or reproductive toxicant category 2 with R60 (May impair fertility) or R61 (May cause harm to the unborn child) (Table 3.2) listed in Appendix 6</p>	<p>mixture is equal to or greater than: — either the relevant specific concentration limit specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008, or, — the relevant concentration specified in Directive 1999/45/EC where no specific concentration limit is set out in Part 3 of Annex VI to Regulation (EC) No 1272/2008. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is marked visibly, legibly and indelibly as follows: "Restricted to professional users".2. By way of derogation, paragraph 1 shall not apply to: (a) medicinal or veterinary products as defined by Directive 2001/82/EC and Directive 2001/83/EC; (b) cosmetic products as defined by Directive 76/768/EEC; (c) the following fuels and oil products: — motor fuels which are covered by Directive 98/70/EC, — mineral oil products intended for use as fuel in mobile or fixed combustion plants, — fuels sold in closed systems (e.g. liquid gas bottles); (d) artists' paints covered by Directive 1999/45/EC; (e) the substances listed in Appendix 11, column 1, for the applications or uses listed in Appendix 11, column 2. Where a date is specified in column 2 of Appendix 11, the derogation shall apply until the said date.</p>
<p>lead(II)sulfate</p>	<p>Lead and its compounds</p>	<p>1. Shall not be placed on the market or used in any individual part of jewellery articles if the concentration of lead (expressed as metal) in such a part is equal to or greater than 0,05 % by weight.2. For the purposes of paragraph 1: (i) "jewellery articles" shall include jewellery and imitation jewellery articles and hair accessories, including: (a) bracelets, necklaces and rings; (b) piercing jewellery; (c) wrist watches and wrist-wear; (d) brooches and cufflinks; (ii) "any individual part" shall include the materials from which the jewellery is made, as well as the individual components of the jewellery articles.3. Paragraph 1 shall also apply to individual parts when placed on the market or used for jewellery-making.4. By way of derogation, paragraph 1 shall not apply to: (a) crystal glass as defined in Annex I (categories 1, 2, 3 and 4) to Council Directive 69/493/EEC (*); (b) internal components of watch timepieces inaccessible to consumers; (c) non-synthetic or reconstructed precious and semiprecious stones (CN code 7103, as established by Regulation (EEC) No 2658/87), unless they have been treated with lead or its compounds or mixtures containing these substances; (d) enamels, defined as vitrifiable mixtures resulting from the fusion, vitrification or sintering of minerals melted at a temperature of at least 500 °C. (*) OJ L 326, 29.12.1969, p. 36.5. By way of derogation, paragraph 1 shall not apply to jewellery articles placed on the market for the first time before 9 October 2013 and jewellery articles produced before 10 December 1961.6. By 9 October 2017, the Commission shall re-evaluate paragraphs 1 to 5 of this entry in the light of new scientific information, including the availability of alternatives and the migration of lead from the articles referred to in paragraph 1 and, if appropriate, modify this entry accordingly.7. Shall not be placed on the market or used in articles supplied to the general public, if the concentration of lead (expressed as metal) in those articles or accessible parts thereof is equal to or greater than 0,05 % by weight, and those articles or accessible parts thereof may, during normal or reasonably foreseeable conditions of use, be placed in the mouth by children. That limit shall not apply where it can be demonstrated that the rate of lead release from such an article or any such accessible part of an article, whether coated or uncoated, does not exceed 0,05 µg/cm² per hour (equivalent to 0,05 µg/g/h), and, for coated articles, that the coating is sufficient to ensure that this release rate is not exceeded for a period of at least two years of normal or reasonably foreseeable conditions of use of the article. For the purposes of this paragraph, it is considered that an article or accessible part of an article may be placed in the mouth by children if it is smaller than 5 cm in one dimension or has a detachable or protruding part of that size.8. By way of derogation, paragraph 7 shall not apply to: (a) jewellery articles covered by paragraph 1; (b) crystal glass as defined in Annex I (categories 1, 2, 3 and 4) to Directive 69/493/EEC; (c) non-synthetic or reconstructed precious and semi-precious stones (CN code 7103 as established by Regulation (EEC) No 2658/87) unless they have been treated with lead or its compounds or mixtures containing these substances; (d) enamels, defined as vitrifiable mixtures resulting from the fusion, vitrification or sintering of mineral melted at a temperature of at least 500 °C; (e) keys and locks, including padlocks; (f) musical instruments; (g) articles and parts of articles comprising brass alloys, if the concentration of lead (expressed as metal) in the brass alloy does not exceed 0,5 % by weight; (h) the tips of writing instruments; (i) religious articles; (j) portable zinc-carbon batteries and button cell batteries; (k) articles within the scope of: (i) Directive 94/62/EC; (ii) Regulation (EC) No 1935/2004; (iii) Directive 2009/48/EC of the European Parliament and of the Council (*); (iv) Directive 2011/65/EU of the European Parliament and of the Council (**).9. By 1 July 2019, the Commission shall re-evaluate paragraphs 7 and 8(e), (f), (i) and (j) of this entry in the light of new scientific information, including the availability of alternatives and the migration of lead from the articles referred to in paragraph 7, including the requirement</p>

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

15 / 17

manganese dioxide

on coating integrity, and, if appropriate, modify this entry accordingly.10. By way of derogation paragraph 7 shall not apply to articles placed on the market for the first time before 1 June 2016.(*). Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009 on the safety of toys (OJ L 170, 30.6.2009, p. 1). (**). Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 174, 1.7.2011, p. 88).

National legislation Belgium

manganese dioxide

No data available

National legislation The Netherlands

manganese dioxide

Waste identification (the Netherlands)	LWCA (the Netherlands): KGA category 05
--	---

Waterbezwaarlijkheid	Z (2)
----------------------	-------

lead(II)sulfate

SZW - List of reprotoxic substances (fertility)	Suspected of damaging fertility.
---	----------------------------------

SZW - List of reprotoxic substances (development)	May damage the unborn child.
---	------------------------------

manganese dioxide

SZW - List of reprotoxic substances (fertility)	Suspected of damaging fertility.
---	----------------------------------

SZW - List of reprotoxic substances (development)	Suspected of damaging the unborn child.
---	---

National legislation France

manganese dioxide

No data available

lead(II)sulfate

Catégorie cancérogène	(C1A,C1B,C2)
-----------------------	--------------

Catégorie toxique pour la reproduction	(R1A,R1B,R2)
--	--------------

National legislation Germany

manganese dioxide

WGK	3; Classification water polluting based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 27 July 2005 (Anhang 4)
-----	---

zinc oxide

TA-Luft	5.2.1
---------	-------

lead(II)sulfate

TA-Luft	5.2.2; II
---------	-----------

manganese dioxide

TA-Luft	5.2.2; III
---------	------------

TRGS900 - Risiko der Fruchtschädigung	Y; Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes nicht befürchtet zu werden Y; Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes nicht befürchtet zu werden
---------------------------------------	--

calcium sulfate

TA-Luft	5.2.1
---------	-------

National legislation United Kingdom

manganese dioxide

No data available

Other relevant data

manganese dioxide

No data available

lead(II)sulfate

TLV - Carcinogen	Lead, inorganic compounds, as Pb; A3
------------------	--------------------------------------

manganese dioxide

TLV - Carcinogen	Manganese, inorganic compounds, as Mn; A4 Manganese, inorganic compounds, as Mn; A4
------------------	--

15.2. Chemical safety assessment

No chemical safety assessment is required; registered as an isolated intermediate.

SECTION 16: Other information

Full text of any H-statements referred to under headings 2 and 3:

H302 Harmful if swallowed.

Reason for revision: 2, 3, 4.1, 15.1

Publication date: 2013-05-07

Date of revision: 2016-04-28

Revision number: 0100

Product number: 28902

16 / 17

manganese dioxide

H332 Harmful if inhaled.

H351 Suspected of causing cancer.

H360 May damage fertility or the unborn child.

H360Df May damage the unborn child. Suspected of damaging fertility.

H372 Causes damage to organs (central nervous system, reproductive organs) through prolonged or repeated exposure if swallowed.

H373 May cause damage to organs through prolonged or repeated exposure.

H373 May cause damage to organs (brain) through prolonged or repeated exposure if inhaled.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

(*) = INTERNAL CLASSIFICATION BY BIG

PBT-substances = persistent, bioaccumulative and toxic substances

CLP (EU-GHS) Classification, labelling and packaging (Globally Harmonised System in Europe)

M-factor

zinc oxide	1	Acute	ECHA
zinc oxide	1	Chronic	ECHA
lead(II)sulfate	1	Acute	BIG

Specific concentration limits CLP

lead(II)sulfate	C ≥ 2,5 %	Repr. 2; H361f	CLP Annex VI (ATP 0)
	C ≥ 0,5 %	STOT RE 2; H373	CLP Annex VI (ATP 0)

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question. Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided and cannot be held liable for any changes by third parties. This safety data sheet is only to be used within the European Union, Switzerland, Iceland, Norway and Liechtenstein. Any use outside of this area is at your own risk. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement or when this is failing the general conditions of BIG. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult the mentioned agreement/conditions for details.

This annex contains information on risk management measures as specified in appendix 3 of the registration dossier for isolated on-site and transported intermediates

1. Brief description of technological process applied in manufacture of the intermediate EC 273-742-8

- During the Zinc electrolysis, insoluble oxy-sulphates, (i.e. Lead- & calcium-sulphate and Manganese dioxide) can be formed at the Lead-anode surface ; part of it falls down in the cells another part sticks to the Lead-anode surface and is separated during the anode-cleaning steps
- The Pb-Mn cellmud is regularly collected from the bottom of the cells and from the anode-cleaning devices. It is settled, washed and filtered.
- Transfer of the Pb-Mn cellmud occurs in big-bags or containers or covered bulk load trucks, according to applicable regulation
- The 'Pb Mn cellmud' is a lumpy wet filtercake with an average Lead-content of 20-30% w/w and is typically used in production units of Lead metal (EC 231-100-4) or Lead compounds and recovery of precious metals
- Waste of the process:
 - None

2. Brief description of technological processes applied in use of the intermediate EC 273-742-8

- The 'Pb Mn cellmud' is unloaded from transport trucks, ADR-big-bags or containers, ...and transferred to storage silo's through especially designed transfer units,
- The 'Pb Mn cellmud' is optionally blended with other Lead-containing primary or secondary materials
- The mixture is continuously fed to smelting furnaces (i.e. ISA, Blast furnace, ISF ...) or similar for further smelting extraction of lead and lead compounds, and precious metals
- Waste treatment:
 - None
 - During pyrometallurgical treatment: slag. The slag is dumped if not re-used in road filling.

3. Means of rigorous containment and minimisation technologies applied by the registrant during the manufacturing and /or use process

⇒ Description of the technical means to rigorously contain the substance

- Process enclosures and closed circuits where relevant and possible
- Containment of liquid volumes in sumps to collect/prevent accidental spillage, acid solutions are treated adequately
- Potential dryers are operated under strong aspiration (negative pressure towards atmospheric pressure)
- All processes are performed in a confined area
- The process is managed and controlled from a separate control-room.

⇒ Identification of residual emissions to workplace & environment

Residual exposures at the workplace and the environment are assessed from regular measurements of dust/metals and represent usually a global exposure to several steps in a process. Dust control: dust and metals in dust needs to be measured in the workplace air (static or individual) according to national regulations.

- Workplaces: dust, metal concentrations?

Annex to the Safety Data Sheet

Slimes and Sludges, zinc sulfate electrolytic (273-742-8)

- Workers: biomonitoring – blood for Pb, twice a year if appropriate or according to regulation
 - Environment air: stack point source measurement (dust, metal concentrations)
 - Environment water: typically measured prior to discharge, if emissions to surface waters are relevant
- Some non-process waters can be generated containing Mn/Pb (e.g. from cleaning)

⇒ Description of the procedural and control technologies to minimise emission and resulting exposure

- The Pb Mn cellmud residue is kept moist, so dust formation/emission is by definition limited
- In the use phase, where it is dried, air emissions are controlled by use of air emission abatement devices e.g. filters, wet scrubbers. This may create a general negative pressure at the system openings (loading, sampling, production exit).
- regular sampling, cleaning, maintenance
- On-site waste water treatment techniques are applied to prevent releases to water (if applicable) e.g.: chemical precipitation, sedimentation and filtration.
- Local exhaust ventilation systems
- Special care for the general establishment and maintenance of a clean working environment by e.g.:
 - Cleaning of process equipment and workshop
 - Contained storage of leach residue in covered areas
- All residues formed during the leaching process (and gas-cleaning system at use site), are recovered and either recycled in the system or handled further according to waste legislation
- Wearing of gloves and protective clothing is compulsory
- With normal handling of the moist residue, no respiratory personal protection (breathing apparatus) is necessary.
- Eyes: safety glasses are recommended or compulsory

⇒ Specification of management means and training that particularly contribute to the functioning of the technical means described above

- integrated management system is implemented on the workplace e.g. ISO 9000, ISO ICS13100 series, ISO 1400X series, EMAS, or alike and, as usually applicable, by being IPPC-compliant (cf. NFM-BREF)
- housekeeping and hygiene procedures in place
- training provided for internal and external cleaning teams or technicians
- Follow up HS by medical unit: biomonitoring if required (e.g.. Pb, ...)

4. Means of rigorous containment and minimisation technologies recommended to the user of the intermediate

- Means of containment and minimisation technologies are same as above
- Blending, and optionally pelletizing, and furnaces are operated under strong aspiration (negative pressure towards atmospheric pressure)
- The zinc leach residue is unloaded from [pneumatic] transport trucks, train, ADR-big-bags or containers, ...and transferred to storage zones or silo's through especially designed transfer units
- Material composition, handling, storage procedures and general guidance on safe use are communicated to the personnel or downstream (external) user by means of Safety Data Sheet

5. Special procedures applied before cleaning and maintenance

- Procedures are in place to ensure safe cleaning and maintenance operations
 - Stopping (part of) the process
 - Cooling down and proper ventilation of equipment
 - Switch off power supply & lock out procedure
 - Special PPE mandatory for cleaning personnel or maintenance technicians
 - Planning and training for internal and external personnel
- general guidance on safe use is communicated to the personnel or downstream (external) user by means of Safety Data Sheet

6. Describe activity and type of PPE in case of accidents, incidents, maintenance and cleaning activities

Accident release measures:

- **Workers:** Immediately contact emergency personnel. Keep unnecessary personnel away.
- Use suitable protective equipment.
- **Environment:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- **Cleaning:** If emergency personnel are unavailable, vacuum or carefully scoop up spilled material and place in an appropriate container for disposal by incineration. Avoid creating dusty conditions and prevent wind dispersal.

Fire: Use an extinguishing agent suitable for the surrounding fire. No specific hazard. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. Thermal decomposition products are sulfur oxides (SO₂, SO₃ etc.) and some metallic oxides. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Periodic maintenance: (Furnace and associated equipment if applicable, Off-gas treatment system, Repair operations, Observational tasks and control activities), the following measures are taken:

- General protective and hygiene measures: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Separate storing of protective / work clothing is necessary. Avoid contact of spilled material and runoff with soil and surface waterways. Use process enclosures, local exhaust ventilation or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
- Respiratory protection: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Eye protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
- Body protection: Usual chemical work clothing.

- Cleaning activity : (Process equipment, workshop): same applies

7. Waste information

- The intermediate is a product for the production of zinc as a metal. If the normal processing route cannot be adhered to, returning it to the producer is recommended. Disposal should be in accordance with the official regulations (hazardous waste)
- PPE equipment is collected and disposed of
- Packaging?

Annex to the Safety Data Sheet

Slimes and Sludges, zinc sulfate electrolytic (273-742-8)

Slimes and Sludges, zinc sulfate electrolytic (273-742-8) process scheme

Lifecycle of slimes and sludges is illustrated by the colored forms

