Safety Data Sheet

29 CFR 1910.1200 App D

Manganese Oxide 60%

Version number: 2.0

SECTION 1: Identification

1.1 Product identifier

Identification of the substance Manganese Oxide 60%

Trade name **Manganese Oxide 60%**

CAS number 1344-43-0

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

Relevant identified uses

Food additive
Agricultural chemicals
Welding and soldering product
Zinc Electrolysis

1.3 Details of the supplier of the safety data sheet

Valudor Products, LLC
179 Calle Magdalena Suite 100
Encinitas, California CA 92024
United States

Telephone: +1 (760) 635 8500
e-mail: info@valudor.com
Website: www.valudor.com

1.4 Emergency telephone number

Emergency information 800-535-5053 (Infotrac)

As above or nearest toxicological information centre.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Classification				
Section	**Hazard class**	**Category**	**Hazard class and category**	**Hazard state-ment**
A.6	carcinogenicity	1A	Carc. 1A	H350

For full text of abbreviations: see SECTION 16

2.2 Label elements

Labelling acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Signal word danger

Pictograms

GHS08

Hazard statements

H350	May cause cancer.

Precautionary statements

P201	Obtain special instructions before use.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313	If exposed or concerned: Get medical advice/attention.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Name of substance	manganese oxide
Identifiers	
CAS No	1344-43-0
Molecular formula	MnO
Molar mass	70.94 $^{g}/_{mol}$
Purity	>80%

Impurities and additives

Name of substance	Identifier	Wt%
aluminium oxide	CAS No 1344-28-1	< 10
diiron trioxide	CAS No 1309-37-1	< 10
silicon dioxide	CAS No 7631-86-9	< 10

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Take off immediately all contaminated clothing.
In case of accident or if you feel unwell, seek medical advice immediately (show the label or safety data sheet where possible).

Following inhalation

Provide fresh air.
If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.

Following skin contact

After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap.
If skin irritation or rash occurs: Get medical advice/attention.

Following eye contact

Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
Get medical advice/attention.

Following ingestion

Rinse mouth. Do not induce vomiting.
Get medical advice/attention if you feel unwell.

Notes for the doctor

None.

4.2 Most important symptoms and effects, both acute and delayed

This information is not available.

4.3 Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

water, foam, alcohol resistant foam, fire extinguishing powder

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Hazardous decomposition products: Section 10.

Hazardous combustion products

metal oxides, (manganese)

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes.
Coordinate firefighting measures to the fire surroundings.
Do not allow firefighting water to enter drains or water courses.
Collect contaminated firefighting water separately.
Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Use suitable breathing apparatus

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Remove persons to safety.
Ventilate affected area.
Do not breathe dust.
Wearing of suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases.

6.2 Environmental precautions

Keep away from drains, surface and ground water.
Retain contaminated washing water and dispose of it.
If substance has entered a water course or sewer, inform the responsible authority.
Stop leak if safe to do so.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Take up mechanically.

Advice on how to clean up a spill

Take up mechanically.
Collect spillage.

Other information relating to spills and releases

Place in appropriate containers for disposal.
Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5.
Personal protective equipment: see section 8.
Incompatible materials: see section 10.
Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes.
Do not breathe dust.

Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation.

Specific notes/details

Dust deposits may accumulate on all deposition surfaces in a technical room.

Measures to protect the environment

Avoid release to the environment.

Advice on general occupational hygiene

Do not eat, drink and smoke in work areas.
Wash hands after use.
Preventive skin protection (barrier creams/ointments) is recommended.
Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities

Flammability hazards

None.

Incompatible substances or mixtures

Incompatible materials: see section 10.

Protect against external exposure, such as

heat, humidity, sunlight

Consideration of other advice

These information are not available.

Ventilation requirements

Provision of sufficient ventilation.

Specific designs for storage rooms or vessels

Store in a dry place.

Packaging compatibilities

Keep only in original container.

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

The following constituents are the only constituents of the product which have a PEL, a TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Occupational exposure limit values (Workplace Exposure Limits)

Country	Name of agent	CAS No	Identifier	TWA [ppm]	TWA [mg/m³]	STEL [ppm]	STEL [mg/m³]	Notation	Source
US	manganese, inorganic compounds	-	TLV®	-	0.1	-	-	i, Mn	ACGIH® 2023
US	manganese, inorganic compounds	-	TLV®	-	0.02	-	-	r, Mn	ACGIH® 2023
US	manganese compounds	-	PEL (CA)	-	0.2	-	-	Mn	Cal/OSHA PEL
US	manganese compounds	-	REL	-	1 (10 h)	-	3	Mn	NIOSH REL
US	manganese compounds	-	PEL	-	-	-	-	Mn	29 CFR 1910.1000
US	Particulates not otherwise regulated	-	PEL (CA)	-	10	-	-	dust	Cal/OSHA PEL
US	Particulates not otherwise regulated	-	PEL (CA)	-	5	-	-	r	Cal/OSHA PEL
US	particulates not otherwise classified	-	REL	-	-	-	-	appx-D	NIOSH REL
US	particulates not otherwise classified (PNOC)	-	PEL	1,766	15	-	-	partml, i, dust	29 CFR 1910.1000
US	particulates not otherwise classified (PNOC)	-	PEL	529.5	5	-	-	partml, r, dust	29 CFR 1910.1000
US	diiron trioxide (iron(III) oxide)	1309-37-1	TLV®	-	5	-	-	r	ACGIH® 2023
US	iron(III) oxide	1309-37-1	PEL (CA)	-	5	-	-	fume	Cal/OSHA PEL
US	iron(III) oxide	1309-37-1	PEL	-	10	-	-	fume	29 CFR 1910.1000
US	iron(III) oxide (diiron trioxide)	1309-37-1	REL	-	5 (10 h)	-	-	df, Fe	NIOSH REL

Occupational exposure limit values (Workplace Exposure Limits)									
Country	**Name of agent**	**CAS No**	**Identifier**	**TWA [ppm]**	**TWA [mg/m³]**	**STEL [ppm]**	**STEL [mg/m³]**	**Notation**	**Source**
US	rouge	1309-37-1	REL	-	-	-	-	appx-D	NIOSH REL
US	rouge	1309-37-1	PEL	-	15	-	-	i, dust	29 CFR 1910.1000
US	rouge	1309-37-1	PEL	-	5	-	-	r, dust	29 CFR 1910.1000
US	alpha-Alumina	1344-28-1	REL	-	-	-	-	appx-D	NIOSH REL
US	alpha-alumina	1344-28-1	PEL	-	15	-	-	i, dust	29 CFR 1910.1000
US	alpha-alumina	1344-28-1	PEL	-	5	-	-	r, dust	29 CFR 1910.1000
US	aluminium, insoluble compounds	1344-28-1	TLV®	-	1	-	-	r	ACGIH® 2023
US	aluminium oxide	1344-28-1	PEL (CA)	-	10	-	-	dust	Cal/OSHA PEL
US	aluminium oxide	1344-28-1	PEL (CA)	-	5	-	-	r	Cal/OSHA PEL
US	silica, amorphous	7631-86-9	REL	-	6 (10 h)	-	-	-	NIOSH REL

Notation

appx-D	see Appendix D - Substances with No Established RELs
df	as dust and fumes
dust	as dust
Fe	calculated as Fe (iron)
fume	as fume
i	inhalable fraction
Mn	calculated as Mn (manganese)
partml	particles/ml
r	respirable fraction
STEL	short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)
TWA	time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified

8.2 Exposure controls

Appropriate engineering controls

Use local and general ventilation.

Individual protection measures (personal protective equipment)

Eye/face protection

Wear eye/face protection.

Hand protection

Protective gloves		
Material	**Material thickness**	**Breakthrough times of the glove material**
these information are not available	these information are not available	these information are not available

Wear suitable gloves.
Chemical protection gloves are suitable, which are tested according to EN 374.
Check leak-tightness/impermeability prior to use.
For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

Respiratory protection

In case of inadequate ventilation wear respiratory protection.
Particle filter device (DIN EN 143).

Thermal hazards

Wear protective gloves against thermal risks (heat and/or fire).

Environmental exposure controls

Use appropriate container to avoid environmental contamination.
Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder)
Color	green - brown
Odor	odorless
Odor threshold	not determined

Other safety parameters

pH (value)	not applicable
Melting point/freezing point	>723 K (ECHA, EU method A.1)
Boiling point or initial boiling point and boiling range	not determined

Flash point	not applicable
Evaporation rate	not determined
Flammability (solid, gas)	non-combustible
Explosive limits	not determined
Explosion limits of dust clouds	not determined
Vapor pressure	not determined
Density	5.4 $^{g}/_{cm^3}$ at 25 °C
Relative density	5.28 at 21 °C (water = 1) (ECHA, EU method A.3)
Relative vapour density	not applicable
Solubility(ies)	
Water solubility	0.001 $^{g}/_{l}$ at 20 °C (ECHA, EU method A.6)
Partition coefficient	
n-octanol/water (log KOW)	not relevant (inorganic)
Auto-ignition temperature	not determined
Decomposition temperature	not relevant
Viscosity	not relevant (solid)
Explosive properties	none
Oxidizing properties	none
Information for relevant hazard classes according to GHS	hazard classes acc. to GHS (physical hazards): not relevant

9.2 Other information there is no additional information

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
See below "Conditions to avoid".

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

There are no specific conditions known which have to be avoided.

10.5 Incompatible materials

oxidizers

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known.
Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

If not otherwise specified the classification is based on:

Animal studies; Evidence from any other toxicity tests; Expert judgment (weight of evidence determination).

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Acute toxicity

Shall not be classified as acutely toxic (oral).
Shall not be classified as acutely toxic (inhalation).
Dermal.
Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Acute toxicity Manganese oxide.

Exposure route	Endpoint	Value	Species	Method	Source
oral	LD0	>2,000 $^{mg}/_{kg}$	rat, female	OECD Guideline 420	ECHA
inhalation: dust/ mist	LC0	>5.35 $^{mg}/_{l}$/4h	rat	OECD Guideline 403	ECHA

Acute toxicity Constituents.

Name of substance	CAS No	Exposure route	End-point	Value	Species	Method	Source
aluminium oxide	1344-28-1	oral	LD0	>10,000 $^{mg}/_{kg}$	rat	OECD Guideline 401	ECHA
diiron trioxide	1309-37-1	oral	LD0	>5,000 $^{mg}/_{kg}$	rat	EU method B.1	ECHA

Name of substance	CAS No	Exposure route	End-point	Value	Species	Method	Source
diiron trioxide	1309-37-1	inhalation: dust/ mist	LC0	>5.05 $^{mg}/_{l}$/4h	rat	OECD Guideline 403	ECHA
silicon dioxide	7631-86-9	oral	LD50	>5,110 $^{mg}/_{kg}$	rat	OECD Guideline 401	ECHA
silicon dioxide	7631-86-9	inhalation: dust/ mist	LC0	5.01 $^{mg}/_{l}$/4h	rat	OECD Guideline 436	ECHA
silicon dioxide	7631-86-9	dermal	LD50	>5,000 $^{mg}/_{kg}$	rabbit	-	ECHA

Skin corrosion/irritation

Shall not be classified as corrosive/irritant to skin.
(ECHA, EU method B.4, EU method B.46, OECD Guideline 404)

Serious eye damage/eye irritation

Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Respiratory or skin sensitization
Skin sensitization

Shall not be classified as a skin sensitizer.
(ECHA, EU method B.42, OECD Guideline 429)

Respiratory sensitization

Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.
(ECHA, OECD Guideline 471, OECD Guideline 473, OECD Guideline 474, OECD Guideline 476, EU method B.13/14)

Carcinogenicity

May cause cancer.

IARC Monographs

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans				
Name of substance	**Name acc. to inventory**	**CAS No**	**Classification**	**Number**
diiron trioxide	Ferric oxide	1309-37-1	3	-
manganese oxide	welding fumes		1	-
silicon dioxide	silica, amorphous	7631-86-9	3	-

Legend

1 Carcinogenic to humans

3 Not classifiable as to carcinogenicity in humans

National Toxicology Program (United States)

not listed

OSHA Carcinogens

Not listed.

Reproductive toxicity

Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Specific target organ toxicity - single exposure

Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Specific target organ toxicity - repeated exposure

Classification could not be established because:
Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

11.2 Other information

There is no additional information.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity (acute)

Based on available data, the classification criteria are not met.
Aquatic toxicity (acute) Manganese Oxide 60%.

Endpoint	Exposure time	Value	Species	Method	Source
EC50	48 h	>4 $^{mg}/_{l}$	daphnia magna	OECD Guideline 202	ECHA
LC50	96 h	>1.2 $^{mg}/_{l}$	rainbow trout (Oncorhynchus mykiss)	OECD Guideline 203	ECHA

Aquatic toxicity (acute) Constituents.

Name of substance	CAS No	Endpoint	Exposure time	Value	Species	Method	Source
diiron trioxide	1309-37-1	EC50	48 h	>100 $^{mg}/_{l}$	daphnia magna	OECD Guideline 202	ECHA
diiron trioxide	1309-37-1	LC0	96 h	≥50,000 $^{mg}/_{l}$	zebra fish (Danio rerio)	-	ECHA
diiron trioxide	1309-37-1	ErC50	72 h	>20 $^{mg}/_{l}$	algae (raphidocelis subcapitata)	OECD Guideline 201	ECHA
silicon dioxide	7631-86-9	EL50	72 h	>1,000 $^{mg}/_{l}$	algae (Scenedesmus subspicatus)	OECD Guideline 201	ECHA
silicon dioxide	7631-86-9	EL50	48 h	>1,000 $^{mg}/_{l}$	daphnia magna	OECD Guideline 202	ECHA
silicon dioxide	7631-86-9	LC50	96 h	>5,000 $^{mg}/_{l}$	fathead minnow (Pimephales promelas)	OECD Guideline 203	ECHA
silicon dioxide	7631-86-9	LL50	96 h	>1,000 $^{mg}/_{l}$	rainbow trout (Oncorhynchus mykiss)	OECD Guideline 203	ECHA
silicon dioxide	7631-86-9	EC50	72 h	>173.1 $^{mg}/_{l}$	algae (Desmodesmus subspicatus)	OECD Guideline 201	ECHA

Aquatic toxicity (chronic)

Based on available data, the classification criteria are not met.

Aquatic toxicity (chronic) Manganese oxide.

Endpoint	Exposure time	Value	Species	Method	Source
EC50	8 d	2.5 $^{mg}/_{l}$	Ceriodaphnia dubia (water flea)	OECD Guideline 211	ECHA
NOEC	8 d	1.3 $^{mg}/_{l}$	Ceriodaphnia dubia (water flea)	OECD Guideline 211	ECHA
LOEC	8 d	4.1 $^{mg}/_{l}$	Ceriodaphnia dubia (water flea)	OECD Guideline 211	ECHA

Aquatic toxicity (chronic) Constituents.

Name of substance	CAS No	Endpoint	Exposure time	Value	Species	Method	Source
aluminium oxide	1344-28-1	EC50	8 d	45 $^{mg}/_{l}$	Ceriodaphnia dubia (water flea)	EPA Method 1002	ECHA
aluminium oxide	1344-28-1	growth (EbCx) 10%	3 h	1,000 $^{mg}/_{l}$	A mixed population of active sewage sludge microorganisms	OECD Guideline 209	ECHA
diiron trioxide	1309-37-1	EC50	3 h	>10,000 $^{mg}/_{l}$	activated sludge of a predominantly domestic sewage	DIN EN ISO 8192	ECHA
diiron trioxide	1309-37-1	NOEC	21 d	≥20 $^{mg}/_{l}$	daphnia magna	OECD Guideline 211	ECHA
diiron trioxide	1309-37-1	NOEC	72 h	≥20 $^{mg}/_{l}$	algae (raphidocelis subcapitata)	OECD Guideline 201	ECHA
silicon dioxide	7631-86-9	NOEC	30 d	42.11 $^{mg}/_{l}$	green algae	QSAR	ECHA
silicon dioxide	7631-86-9	NOEC	21 d	68 $^{mg}/_{l}$	daphnia magna	OECD Guideline 211	ECHA
silicon dioxide	7631-86-9	NOEC	30 d	86.03 $^{mg}/_{l}$	fish	QSAR	ECHA
silicon dioxide	7631-86-9	NOEC	72 h	173.2 $^{mg}/_{l}$	algae (Desmodesmus subspicatus)	OECD Guideline 201	ECHA
silicon dioxide	7631-86-9	LOEC	21 d	149.2 $^{mg}/_{l}$	daphnia magna	OECD Guideline 211	ECHA

12.2 Persistence and degradability

Biodegradation

The study does not need to be conducted because the substance is inorganic.

Persistence

The study does not need to be conducted because the substance is inorganic.

12.3 Bioaccumulative potential

No data available.

n-octanol/water (log KOW) not relevant (inorganic)

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

12.6 Endocrine disrupting properties Other adverse effects

Not listed.

Remarks

None.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packages

Completely emptied packages can be recycled.
Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1	**UN number**	not assigned
14.2	**UN proper shipping name**	-
14.3	**Transport hazard class(es)**	-
14.4	**Packing group**	-
14.5	**Environmental hazards**	-
14.6	**Special precautions for user**	-
14.7	**Transport in bulk according to IMO instruments**	-

14.8 Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT) Additional information

Not subject to transport regulations.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

National regulations (United States)

Toxic Substance Control Act (TSCA) Substance is listed (ACTIVE)

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

Not listed

Specific Toxic Chemical Listings (EPCRA Section 313)

Toxics Release Inventory: Specific Toxic Chemical Listings			
Name of substance	**CAS No**	**Remarks**	**Effective date**
aluminium oxide	1344-28-1	fibrous forms	1987-01-01
manganese oxide		-	1987-01-01

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

Not listed

Clean Air Act

Not listed

Right to Know Hazardous Substance List

Cleaning Product Right to Know Act Substance List (CA-RTK)

Name of substance	CAS No	Functionality	Authoritative Lists
manganese oxide	-	-	ATSDR Neurotoxicants CA NLs CA TACs CDC 4th National Exposure Report CWA 303(d) IRIS Neurotoxicants OEHHA RELs

Toxic or Hazardous Substance List (MA-TURA)

Name of substance	CAS No	DEP CODE	PBT / HHS / LHS	PBT / HHS Threshold	De Minimis Concentration Threshold
aluminium oxide	1344-28-1	-	-	-	1.0 %
manganese oxide	-	1027	-	-	1.0 %

Hazardous Substances List (MN-ERTK)

Name of substance	Name acc. to inventory	CAS No	References	Remarks
diiron trioxide	Iron oxide (Fe2O3), as Fe	1309-37-1	A, O	fume
diiron trioxide	Rouge	1309-37-1	A	-
aluminium oxide	a-Alumina	1344-28-1	A	-
aluminium oxide	Aluminum oxide	1344-28-1	A	-
manganese oxide	Welding fumes	-	A	fume
silicon dioxide	Silica (SiO2)	7631-86-9	A, N, O, R, *	-

Legend

* Substances which are regulated by OSHA as carcinogens; have been categorized by the ACGIH as either "human carcinogens" or "suspect of carcinogenic potential for man"; have been evaluated by the International Agency for Research on Cancer (IARC) and found to be carcinogens or potential carcinogens; or have been listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP).

A American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1992-93", available from ACGIH

fume Small solid particles formed by the condensation of vapors of solid materials.

N National Institute for Occupational Safety and Health (NIOSH), "Recommendations for Occupational Safety and Health Standards," August 1988, available from NIOSH, Publications Dissemination Office, Division of Standards Development and Technology Transfer

O Occupational Safety and Health Administration (OSHA), Safety and Health Standards, Code of Federal Regulations, title 29, part 1910, subpart Z, "Toxic and Hazardous Substances, 1990." General information: Minnesota Department of Labor and Industry, Occupational Safety and Health Division

R International Agency for Research on Cancer (IARC) Monographs on the Evaluation of the Carcinogenic Risks to Humans; Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42, Supplement 7 (1987). Available from: WHO Publications Centre USA

Hazardous Substance List (NJ-RTK)

Name of substance	Name acc. to inventory	CAS No	Remarks	Classifications	Listed in	Substance number	DOT number
diiron trioxide	IRON OXIDE (IRON OXIDE (Fe2O3), FERRIC OXIDE)	1309-37-1	-		1 2 4 7	1036	-
aluminium oxide	ALUMINUM OXIDE (ALUMINUM OXIDE (Al2O3), alpha-ALUMINA)	1344-28-1	-		1 2 4 6 18	2891	-

Name of substance	Name acc. to inventory	CAS No	Remarks	Classifications	Listed in	Substance number	DOT number
manganese oxide	manganese compounds	-	-		1 2 4 6 18 20	2324	-

Legend

1 Occupational Safety and Health Administration, 29 CFR 1910-Occupational Safety and Health Standards, Subpart Z-Toxicand Hazardous Substances, July 1, 2008.

18 List of Toxics Release Inventory Chemicals, Section 313, Emergency Planning and Community Right to Know Act (EPCRA), Toxics Release Inventory (TRI) Program, U.S. Environmental Protection Agency, 40 CFR 372.65, July 1, 2008.

2 "2009 TLVs® and BEIs®, Threshold Limit Values and Biological Exposure Indices," American Conference of Governmental Industrial Hygienists (ACGIH), 2009.

20 List of Hazardous Substances and Reportable Quantities (RQ) , Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), U.S. Environmenta l Protection Agency, 40 CFR 302, Table 302.4, July 1, 2008.

4 "NIOSH Pocket Guide to Chemical Hazards," National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, No. 2005-149, September 2005.

6 "Environmental Hazardous Substance List," New Jersey Department of Environmental Protection, N.J.A.C. 7:1G-2, as printed in the Community Right to Know Survey Instruction Book, 2008.

7 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, "All Supplements, All Volumes, Groups 1, 2A, 2B, and 3, International Agency for Research on Cancer (IARC), World Health Organization, 2008.

Hazardous Substance List (Chapter 323) (PA-RTK)

Name acc. to inventory	CAS No	Classification
IRON OXIDE (FE2O3)	1309-37-1	-
ALUMINUM OXIDE (AL2O3)	1344-28-1	E
MANGANESE	7439-96-5	*, E
WELDING FUMES	-	-
SILICA	7631-86-9	-

Legend

* Any compound of this substance is also an environmental hazard

E Environmental hazard

Hazardous Substance List (RI-RTK)

Name of substance	Name acc. to inventory	CAS No	References
diiron trioxide	Iron oxide fume, as Fe.	1309-37-1	T
diiron trioxide	Rouge	1309-37-1	T
aluminium oxide	Aluminum oxide - "inert" particulate	1344-28-1	T
aluminium oxide	alpha-Alumina	1344-28-1	T
manganese oxide	Welding fumes (NOC)	-	T

Legend

T Toxicity (ACGIH®)

California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

Not listed

Drug precursors, Chemicals designated within the Controlled Substances Act, 21 U.S.C. § 802, paragraphs 34 (list I) and 35 (list II)

Not listed

Industry or sector specific available guidance(s)

NPCA-HMIS® III

Hazardous Materials Identification System.
American Coatings Association.

Category	Rating	Description
Chronic	*	chronic (long-term) health effects may result from repeated overexposure
Health	1	irritation or minor reversible injury possible
Flammability	0	material that will not burn under typical fire conditions
Physical hazard	0	material that is normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosive
Personal protection	-	-

NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).

Category	Degree of hazard	Description
Flammability	0	material that will not burn under typical fire conditions
Health	1	material that, under emergency conditions, can cause significant irritation
Instability	0	material that is normally stable, even under fire conditions
Special hazard	-	-

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance by the supplier.

SECTION 16: Other information, including date of preparation or last revision

Date of preparation: 2023-05-02
Date of last revision: 2023-05-03.

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
29 CFR 1910.1000	29 CFR 1910.1000, Tables Z-1, Z-2, Z-3 - Occupational Safety and Health Standards: Toxic and Hazardous Substances (permissible exposure limits)
49 CFR US DOT	49 CFR U.S. Department of Transportation
ACGIH®	American Conference of Governmental Industrial Hygienists
ACGIH® 2023	From ACGIH®, 2023 TLVs® and BEIs® Book. Copyright 2023. Reprinted with permission. Information on the proper use of the TLVs® and BEIs®: http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement
Cal/OSHA PEL	California Division of Occupational Safety and Health (Cal/OSHA): Permissible Exposure Limits (PELs)
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DEP CODE	Department of Environmental Protection Code
DGR	Dangerous Goods Regulations (see IATA/DGR)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EL50	Effective Loading 50 %: the EL50 corresponds to the loading rate required to produce a response in 50% of the test organisms
ErC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
HHS	Higher hazard substance
IARC	International Agency for Research on Cancer

Abbr.	Descriptions of used abbreviations
IARC Mono-graphs	IARC Monographs on the Evaluation of Carcinogenic Risks to Humans
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
LHS	Lower hazard substance
LL50	Lethal Loading 50 %: the LL50 corresponds to the loading rate causing 50 % lethality
LOEC	Lowest Observed Effect Concentration
NIOSH REL	National Institute for Occupational Safety and Health (NIOSH): Recommended Exposure Limits (RELs)
NOEC	No Observed Effect Concentration
NPCA-HMIS® III	National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
STEL	Short-term exposure limit
TLV®	Threshold Limit Values
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT).
International Maritime Dangerous Goods Code (IMDG).
Dangerous Goods Regulations (DGR) for the air transport (IATA).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	Text
H350	May cause cancer.

Responsible for the safety data sheet

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Disclaimer

This information is based upon the present state of our knowledge.
This SDS has been compiled and is solely intended for this product.