1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: ***Micromax® FF***

REACH Registration No.: 01-2119448167-35-0001

Synonyms: Manganese tetraoxide,Trimanganese tetraoxide, Mn_3O_4, manganomanganic oxide.

IUPAC name: Trimanganese tetroxide

CAS No.: 1317-35-7

EC No.: 215-266-5

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

Product application: Weight material in oilwell cement and drilling fluids.

1.3. Details of the supplier of the safety data sheet

Address/Phone No.: **Elkem ASA, Silicon Products**
P.O. Box 334 Skøyen
N-0213 Oslo, Norway
Telephone: + 47 22 45 01 00
https://www.elkem.com/silicon-products/

Contact: support.siliconproducts@elkem.com

1.4. Emergency telephone number

Chemtrec (800) 424-9300

2. Hazards identification

2.1. Classification of the substance or mixture.

Classification according to the OSHA HCS/HazCom 2012 final rule and the UN GHS:
Classified as Repro Cat 2 (H361): Suspected of damaging fertility or the unborn child.

2.2. Label elements

Hazard pictograms:

Signal word: Warning

Hazard statements:

H361: Suspected of damaging fertility or the unborn child.

Precautionary statements:

P201:	Obtain special instructions before use.
P202:	Do not handle until all safety precautions have been read and understood.
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/national regulations.

2.3. Other hazards

Long term inhalation (years) of dust from manganese oxides might cause adverse health effects.
(See section 11).

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3. Composition/information on ingredients

3.1. Substances

Trimanganese tetraoxide:	100 %
CAS No.:	1317-35-7
EINECS No.:	215-266-5

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4. First aid measures

4.1. Description of first aid measures

Eye contact:	Rinse eyes with water/saline solution. See a physician on persistent feeling of discomfort.
Inhalation:	Irritation caused by dust: Fresh air. See a physician on persistent feeling of discomfort.
Skin contact:	Wash skin with water and/or a mild detergent.
Ingestion:	Remove the person affected from dusty area. See inhalation.

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

May cause irritation. See section 11 for more information.

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

Treat symptomatically (see 4.1).

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5. Firefighting measures

5.1. Extinguishing media: Not applicable. Depending on surrounding fire.

5.2. Special hazards arising from the substance or mixture:

The product is not combustible. The product is formed under surplus of oxygen (O_2) and there is thus no. inherent risk of dust explosion.

5.3. Advice for firefighters:

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Avoid handling that generates build-up of dust.

6.2. Environmental precautions
Released material should be collected in suitable containers.

6.3. Methods and material for containment and cleaning up
Contaminated material should be disposed of in accordance with applicable federal and local regulations.

6.4. Reference to other sections
See section 8 and 13.

7. Handling and storage

7.1. Precautions for safe handling

7.1.1.
Avoid generation of dust. See section 8.

7.1.2.
Do not eat, drink or smoke at the workplace. Wash hands after handling and remove contaminated clothes before entering the dining room.

7.2. Conditions for safe storage, including any incompatibilities
Keep away from hydrochloric acid (HCl). The product must be stored under dry conditions and not exposed to water.

7.3. Specific end use(s): -

8. Exposure controls / personal protection

8.1. Control parameters

Evaluation	Occupational Exposure limits values		Remarks
	8-hour TWA (mg/m^3)	**15 min STEL (mg/m^3)**	
IARC/WHO	-	-	-
ACGIH (2016)	$0.1^{(I)}$ $0.02^{(R)}$	-	A4, Manganese [7439-96-5], elemental and inorganic compounds, as Mn.
Cal/OSHA PEL	0.2	-	As of 3/29/2019, Manganese compounds (as Mn)
NIOSH REL	1	3	10-hour TWA
EU SCOEL	$0.2^{(I)}$ $0.05^{(R)}$	-	OELs based on human data; most sensitive endpoint: neurotoxicity. SCOEL recommends to use the respirable fraction for measuring exposure. However, because of variations in particle size (respirable vs inhalable fraction) between industries, an OEL for the inhalable fraction is also derived.
GE (DFG)	$0.2^{(I)}$ $0.02^{(R)}$	$0.16^{(I)}$* $0.2^{(R)}$** $1.6^{(I)}$* $0.02^{(R)}$**	* Category II; exceedance factor = 8 ** only for permanganate; Cat. II; exceedance factor = 1
GE (AGS)	$0.5^{(R)}$, as Mn	-	No risk for teratogenic effects if OEL is not exceeded.
UK	0.5, as Mn	-	-
FR	1, as Mn	-	-
FI	$0.2^{(I)}$ $0.02^{(R)}$	-	-
REACH	0.02	-	$DNEL_{Long\text{-}term}$ for dermal exposure = 0.00414 mg/kg bw/day.

(I) = inhalable fraction
(R) = respirable fraction

Reference: RIVM Letter report 2014-0151, National Institute for Public Health and the Environment, NL

Derived No Effect Levels (DNELS) for Workers:

Route	Type of effect	Risk characterisation type	Hazard conclusion (see section 5.11)
Inhalation	Systemic effects - long term	Quantitative	OEL = 0.2 mg/m³
	Systemic effects - acute	Qualitative	No-threshold effect and/or no dose-response information available
	Local effects - long term	Quantitative	DNEL (Derived No Effect Level) = 0.2 mg/m³
	Local effects - acute	Quantitative	DNEL (Derived No Effect Level) = 0.2 mg/m³
Dermal	Systemic effects - long term	Quantitative	DNEL (Derived No Effect Level) = 4.14E-3 mg/kg bw/day
	Systemic effects - acute	Qualitative	No-threshold effect and/or no dose-response information available
	Local effects - long term	Qualitative	Insufficient data available (further information necessary)
	Local effects - acute	Qualitative	No-threshold effect and/or no dose-response information available
Eye	Local effects	Not needed	No hazard identified

8.2. Exposure controls
Personal protection equipment
Eye protection and eye flushing facilities. Use working gloves against mechanical risks according to EN 388 and exposure to dust/dirt. Be aware that liquids can penetrate the gloves.
Wear respiratory protection 29 CFR 1910.134 or CSA Standard Z94.4-M1982 for dust exposure that may exceed exposure limits.

Environmental exposure controls

Limit value for PM_{10} and $PM_{2.5}$ (Directive 2008/50/EC):

	Averaging period	Limit value
PM_{10}	One day	50 µg/m³★
PM_{10}	Calendar year	25 µg/m³
$PM_{2,5}$	Calendar year	15 µg/m³

★Not to be exceeded more than 30 times a calendar year.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form:	Powder with particle diameter 3-100 µm, of which 90 % have a particle diameter < 5 µm. Dust forms agglomerates.
Colour:	Reddish brown.
Odour:	Odourless.
Flash point:	Not applicable
Combustion temperature:	Not applicable
Explosion limit in air:	Not applicable
Melting Point (°C):	1550-1650
Solubility (Water):	0.79 g/l I.
Solubility (Organic solvents):	Insoluble/slightly soluble.
Specific Gravity (water =1):	4.8
pH value:	7-10; 5 g product in 50 ml distilled water.

9.2. Other information

No other information.

10. Stability and reactivity

10.1. Reactivity: Stable under normal conditions.
10.2. Chemical stability: Stable under normal conditions.
10.3. Possibility of hazardous reactions:
Reacts with concentrated hydrochloric acid.
10.4. Conditions to avoid:
Avoid generation of dust.
10.5. Incompatible materials:
Concentrated hydrochloric acid (HCl). Hydrogen peroxide (H_2O_2).
10.6. Hazardous decomposition products: Concentrated hydrochloric acid reacts with the product. forming toxic chlorine gas (Cl_2) under certain conditions.

11. Toxicological Information

11.1. Information on toxicological effects

Acute toxicity:	No hazard classification. Dust may cause mechanical irritation of mucous membranes. Inhalation of high concentrations of Mn vapour or Mn oxide fumes (See section 8) can result in chemical pneumonia.
Skin corrosion/irritation:	No hazard classification. Dust may cause mechanical irritation.
Serious eye damage/irritation:	No hazard classification. Dust may cause mechanical irritation.
Respiratory or skin sensitisation:	No hazard classification. Dust may cause mechanical irritation of mucous membranes.
Mutagenicity:	No hazard classification.
Carcinogenicity:	No hazard classification.
Reproductive toxicity:	Suspected of damaging fertility or the unborn child.
STOT-single exposure:	No hazard classification.
STOT-repeated exposure:	No hazard classification.
Aspiration hazard:	No hazard classification.

Manganese is an essential trace metal in all living organisms. Long-term inhalation (years) of manganese oxides may cause chronic manganese intoxication (manganism) affecting the central nervous system (CNS), and lead to extensive disablement, that cannot be cured.

Fumes/dust of MnO_2 (tetravalent manganese (Mn[IV])) is classified as harmful to health. The product contains divalent and trivalent manganese (Mn[II] and Mn[III]). Mn[IV] has not been detected in the product.

Endocrine disrupting properties: The product is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU)2017/2100 or Commission Regulation (EU)2018/605.

12. Ecological Information

12.1. Ecotoxicity:
The product does not meet the classification criteria for ecotoxicological endpoints in accordance with Regulation (EC) 1272/2008 (CLP) and the UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS, 9th rev.).

Acute (short-term) toxicity:
Fish (Read across data from MnO): OECD guideline 203, EU method C1 and GLP. LD50 (96h) for fresh water fish: 100% v/v; NOEC 100% v/v
Crustacean: OECD guideline 202, EU method C2 and GLP. EC50/LC50 (48h) for fresh water invertebrates: >0.0219 mg/L: NOEC (48h): 0.0219 mg/L
Algae/aquatic plants (Read across data from MnO): OECD 201, EU method C3 and GLP. EC50 (72h): >100% v/v. NOEC (72h): 100%v/v
ASRI (Activated sludge respiratory inhibition) OECD guideline 209, EU method C11 and GLP. EC50: >1000 mg/L; NOEC (>3h): >1000 mg/L

PNEC Derivation and other Environmental hazard conclusions:

Compartment	Hazard conclusion	Remarks/Justification
Freshwater	no hazard identified: Intermittent releases:	The substance is not hazardous to the environment.
Marine water	no hazard identified: Intermittent releases:	The substance is not hazardous to the environment.
Sediments (freshwater)	no hazard identified:	The substance is not hazardous to the environment.
Sediments (marine water)	no hazard identified:	The substance is not hazardous to the environment.
Sewage treatment plant	no hazard identified:	The substance is not hazardous to the environment.
Soil	no hazard identified:	The substance is not hazardous to the environment.
Air	no hazard identified:	
Secondary poisoning	no potential for bioaccumulation:	Bioaccumulation of Mn_3O_4 is not expected to occur. Hence no secondary poisoning risk exists.

12.2. Persistence and degradability: Not relevant for inorganic substances.
12.3. Bioaccumulative potential: Not relevant.
12.4. Mobility in soil: The product is not mobile under normal environmental conditions.
12.5. Results of PBT and vPvB assessment: Not relevant for inorganic compounds.
12.6 Endocrine disrupting properties: The product is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU)2017/2100 or Commission Regulation (EU)2018/605.
12.6. Other adverse effects: None.

13. Disposal Considerations

13.1. Waste treatment methods

The product should be recovered for recycling if possible.
The product is not a listed RCRA Hazardous Waste (40 CFR 261).
Prior to disposal of large quantities of this material advice should be sought from the relevant Waste Regulation Authority.

Packaging:

-

14. Transport information

UN number:	not classified
UN proper shipping name:	not applicable
Transport hazard class:	not applicable
Packing group:	not applicable
Environmental hazard:	The product is not a marine pollutant.

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): not classified
Special precautions: none

15. Regulatory Information

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

National and international legislation/requirements:
This Safety Data Sheet is prepared in compliance the OSHA HazCom Std. 2012 (final rule).

OSHA:	This safety data sheet has been compiled in accordance with the revised Hazard Communication Standard (HCS 2012) and applies GHS classification criteria.
TSCA:	The product is listed in the TSCA (Toxic Substance Control Act) Inventory ID 8275, CAS # 1317-35-7 (Manganese oxide, Mn_3O_4)
CERCLA:	(Comprehensive Response Compensation, and Liability Act): The product and its components are not listed in 40 CFR 302.4.
RCRA:	(Resource Conservation/Recovery Act): The product is not a listed hazardous waste.
SARA TITLE III:	(Superfund Amendments and Reauthorization Act): 311/312 Hazard Categories: Immediate Health, Delayed Health. 313 Reportable Ingredients: Manganese Compounds (Category Code N450).

CALIFORNIA PROPOSITION 65: None

IARC:	The product is not classified as a carcinogen by IARC.
US-NTP:	The ingredients of the product are not listed in the 2011 Report on Carcinogens (RoC).
WHMIS:	not classified. SDS complies with WHMIS 2015.
DSL Canada	The product is specified on the public Portion of the Domestic Substances List (identifier: 1317-35-7).

15.2. Chemical safety assessment:

A chemical safety assessment (CSA) has been carried out for the substance in accordance with Regulation (EC) 1907/2006 (REACH).

16. Other Information

(i) Indication of changes:

Classification of trimanganese tetroxide as Repr. Cat. 2.
Rev 03: company info (1.3) and limit values (8.2) updated.
Rev 04: new company info(1.3), and logo, GHS reference updated to 9th edition., added paragraphs on endocrine disrupting properties in section 11 and 12.6,
Rev 05: storage conditions in section 7.2 updated.

(ii) Abbreviations and acronyms

CAS No:	Chemical Abstracts Service number
CE:	Conformité Européene (Key indicator of a product's compliance with EU legislation)
CLP:	Classification, Labelling and Packaging Regulation
CSA:	Chemical Safety Assessment
CSR:	Chemical Safety Report
EC:	European Commission
ECHA:	European Chemicals Agency
EINECS:	European Inventory of Existing Commercial Chemical Substances
IMDG:	International Maritime Dangerous Goods Code
ADR	The European Agreement concerning the International Carriage of Dangerous Goods by Road
RID:	Regulations concerning the International Carriage of Dangerous Goods by Rail
ICAO:	International Civil Aviation Organization
IATA:	International Air Transport Association
N/A:	Not applicable
NIOSH:	National Institute for Occupational Safety and Health
OSHA:	Occupational Safety and Health Agency
PEL:	Permissible Exposure Limit
PM_{10}:	Particulate matter which passes through a size-selective inlet as defined in the reference method for the sampling and measurement of PM_{10}, EN 12341, with a 50 % efficiency cut-off at 10 µm aerodynamic diameter.
$PM_{2.5}$:	Particulate matter which passes through a size-selective inlet as defined in the reference method for the sampling and measurement of $PM_{2.5}$, EN 14907, with a 50 % efficiency cut-off at 2.5 µm aerodynamic diameter.
PNEC:	Predicted No-Effect Concentration
PBT:	Persistent, Bioaccumulative and Toxic
REACH:	Registration, Evaluation and Authorisation of Chemicals
vPvB:	Very Persistent and very Bioaccumulative
SDS:	Safety Data Sheet
TLV:	Threshold Limit Value
TWA:	Time–Weighted Average
STEL:	Short-term exposure limit
UN GHS:	United Nations Globally Harmonized System of Classification and Labelling of Chemicals

(iii) Key literature references and sources for data
Literature references are available upon request.

(iv) Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:
- CSR for trimanganese tetraoxide
- Expert judgement.

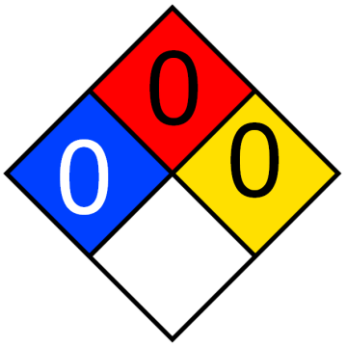
(v) Relevant H-statements:
H361: Suspected of damaging fertility or the unborn child.

(vi) Training advice
-

(vii) Further information:
Micromax® is a registered trademark owned by Elkem ASA.

HMIS III (Hazardous Materials Information System)

HEALTH	* 0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	E (see section 8)



NFPA 704 (National Fire Protection Association)

HEALTH	0
FLAMMABILITY	0
INSTABILITY/REACTIVITY	0
SPECIAL NOTICE	

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