SAFETY DATA SHEET

Issuing Date 20-Jan-2015 **Revision Date** 20-Jan-2015 **Revision Number** 0

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

GHS product identifier

Product Name **Tiger Micronutrients® Manganese 15%**

Other means of identification

Synonyms Tiger Mn 15%, Manganese, Sulphur

Recommended use of the chemical and restrictions on use

Recommended Use Plant nutrient fertilizer

Uses advised against No information available

Supplier's details

Supplier Address
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Emergency telephone number

Emergency Telephone Number Canada --- 877-299-3399
USA --- 800-239-3647

2. HAZARDS IDENTIFICATION

Classification

Acute Dermal Toxicity	Category 4
Skin Corrosion/Irritation	Category 2
Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Carcinogenicity	Category 2
Combustible Dust	Yes

GHS Label elements, including precautionary statements

Emergency Overview

Signal Word **Danger**

Hazard Statements

• Harmful in contact with skin
• Causes skin irritation
• May cause allergy or asthma symptoms or breathing difficulties if inhaled
• May cause an allergic skin reaction
• Suspected of causing cancer
•
• May form combustible dust concentrations in air

Appearance Greenish-tan **Physical State** Solid (compressed). **Odor** No information available

Precautionary Statements

Prevention

• Obtain special instructions before use.
• Do not handle until all safety precautions have been read and understood.
• Use personal protective equipment as required.
• Wash face, hands and any exposed skin thoroughly after handling.
• Wear protective gloves.
• Avoid breathing dust/fume/gas/mist/vapors/spray.
• In case of inadequate ventilation wear respiratory protection.
• Contaminated work clothing should not be allowed out of the workplace.

General Advice

• Specific measures (see supplemental first aid instructions on this label)
• If exposed or concerned: Get medical attention/advice
• Specific treatment (see supplemental instructions on the administration of antidotes on this label)

Skin

• IF ON SKIN: Wash with plenty of soap and water.
• Call a POISON CENTER or doctor/physician if you feel unwell.
• Take off contaminated clothing and wash before reuse.
• If skin irritation or rash occurs: Get medical advice/attention.

Inhalation

• IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing
• If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

Storage

• Store locked up.

Disposal

• Dispose of contents/container to an approved waste disposal plant.

Hazard Not Otherwise Classified (HNOC)

Not applicable

Other information

May cause irritation of respiratory tract. Dust contact with the eyes can lead to mechanical irritation. Powdered material may form explosive dust-air mixtures.
Toxic to aquatic life.

<1% of the mixture consists of ingredient(s) of unknown toxicity.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Tiger Mn 15%, Manganese, Sulphur

Chemical Name	CAS-No	Weight %
Sulfur	7704-34-9	65
Manganese oxide (MnO)	1344-43-0	15
Iron oxide	1309-37-1	3.96
Silicon dioxide	7631-86-9	2.88
Aluminum oxide	1344-28-1	2.7
Cobalt	7440-48-4	0.108

4. FIRST AID MEASURES

Description of necessary first-aid measures

Eye Contact Rinse thoroughly with water as necessary. Get medical attention if irritation occurs.

Skin Contact Wash off immediately with soap and plenty of water for at least 15 minutes while removing all contaminated clothing and shoes. Seek immediate medical attention/advice.

Inhalation IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Seek immediate medical attention/advice.

Ingestion Do NOT induce vomiting. Drink plenty of water. Consult a physician. Never give anything by mouth to an unconscious person.

Most important symptoms/effects, acute and delayed

Most Important Symptoms/Effects Respiratory irritation. Dermal irritation. May cause allergic skin reaction. Hives. Itching. Rashes. Mechanical irritation of the eyes is possible.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water spray or fog is preferred; if water not available use dry chemical, CO_2 or regular foam. Small fires may be smothered with sand.

Unsuitable Extinguishing Media Do not scatter spilled material with high pressure water streams.

Specific Hazards Arising from the Chemical

Avoid dust formation. Dust suspended in air is readily ignited by flames, static electricity or friction spark. Every reasonable step must be taken to minimize dust formation. Sulfur dioxide reacts with water to form sulfuric acid.

Explosion Data

Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	Yes.

Protective Equipment and Precautions for Firefighters

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation. Avoid dust formation. Avoid contact with the skin and the eyes. Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Environmental Precautions Do not allow material to contaminate ground water system.

Methods and materials for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Ensure adequate ventilation. Do not get in eyes. Avoid dust formation in confined areas. Keep away from open flames, hot surfaces and sources of ignition. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Dust tight castings should be equipped with explosion relief vents. Sparkles electrical equipment is recommended.

Conditions for safe storage, including any incompatibilities

Storage Keep in a dry, cool and well-ventilated place.

Incompatible Products Incompatible with oxidizing agents; Acids.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Manganese oxide (MnO) 1344-43-0	TWA: 0.2 mg/m³ Mn	(vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³ Mn	IDLH: 500 mg/m³ Mn TWA: 1 mg/m³ Mn STEL: 3 mg/m³ Mn
Bentonite 1302-78-9	TWA: 1 mg/m³ respirable fraction	-	-
Iron oxide 1309-37-1	TWA: 5 mg/m³ respirable fraction	TWA: 10 mg/m³ fume (vacated) TWA: 10 mg/m³ fume	IDLH: 2500 mg/m³ Fe dust and fume TWA: 5 mg/m³ Fe dust and fume
Silicon dioxide 7631-86-9	10 mg/m³	20 mppcf TWA; ((80)/(% SiO2) mg/m³)	IDLH: 3000 mg/m³ TWA: 6 mg/m³

Aluminum oxide 1344-28-1	TWA: 1 mg/m³ respirable fraction	TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction (vacated) TWA: 10 mg/m³ total dust (vacated) TWA: 5 mg/m³ respirable fraction	-
Magnesium oxide fume 1309-48-4	TWA: 10 mg/m³ inhalable fraction	TWA: 15 mg/m³ fume, total particulate (vacated) TWA: 10 mg/m³ total particulate	IDLH: 750 mg/m³ fume
Cobalt 7440-48-4	TWA: 0.02 mg/m³	TWA: 0.1 mg/m³ dust and fume (vacated) TWA: 0.05 mg/m³ dust and fume	IDLH: 20 mg/m³ dust and fume TWA: 0.05 mg/m³ dust and fume
Phosphorus 7723-14-0	-	TWA: 0.1 mg/m³ (vacated) TWA: 0.1 mg/m³	IDLH: 5 mg/m³ TWA: 0.1 mg/m³
Calcium oxide 1305-78-8	TWA: 2 mg/m³	TWA: 5 mg/m³ (vacated) TWA: 5 mg/m³	IDLH: 25 mg/m³ TWA: 2 mg/m³
Lead 7439-92-1	TWA: 0.05 mg/m³	TWA: 50 µg/m³ Action Level: 30 µg/m³ Poison, See 29 CFR 1910.1025	IDLH: 100 mg/m³ TWA: 0.050 mg/m³
Arsenic 7440-38-2	TWA: 0.01 mg/m³	TWA: 10 µg/m³ As Action Level: 5 µg/m³ As (vacated) TWA: 0.5 mg/m³	IDLH: 5 mg/m³ Ceiling: 0.002 mg/m³ 15 min
Copper 7440-50-8	TWA: 0.2 mg/m³ fume	TWA: 0.1 mg/m³ fume TWA: 1 mg/m³ dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³ dust, fume and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume
Cadmium and compounds (as Cd) 7440-43-9	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³ respirable fraction	TWA: 0.1 mg/m³ fume applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect TWA: 0.2 mg/m³ dust applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect TWA: 5 µg/m³ Action Level: 2.5 µg/m³ (vacated) STEL: 0.3 ppm fume Ceiling: 0.3 mg/m³ fume applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect Ceiling: 0.6 mg/m³ dust applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect	IDLH: 9 mg/m³ dust
Mercury 7439-97-6	TWA: 0.025 mg/m³ S*	(vacated) TWA: 0.05 mg/m³ vapor (vacated) STEL: 0.03 mg/m³ (vacated) S* (vacated) Ceiling: 0.1 mg/m³	IDLH: 10 mg/m³ Ceiling: 0.1 mg/m³ TWA: 0.05 mg/m³ vapor

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/Face Protection Safety glasses with side-shields.
Skin and Body Protection Long sleeved clothing. Impervious gloves.
Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Provide regular cleaning of equipment, work area and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Solid (compressed)	**Appearance**	Greenish-tan
Odor	No information available	**Odor Threshold**	No information available

Property	Values	Remarks/ - Method
pH	No data available	None known
Melting Point/Range	119 °C	None known
Boiling Point/Boiling Range	444 °C	None known
Flash Point	188 °C	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limits in Air		
upper flammability limit	1400 gm/m^3	
lower flammability limit	35 gm/m^3	
Vapor Pressure	No data available	None known
Vapor Density	No data available	None known
Specific Gravity	2.07	None known
Water Solubility	Insoluble	None known
Solubility in other solvents	No data available	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition Temperature	190 °C	None known
Decomposition Temperature	No data available	None known
Viscosity	Solid	None known

Flammable Properties Not flammable

Explosive Properties No data available
Oxidizing Properties No data available

Other information

VOC Content (%) None

10. STABILITY AND REACTIVITY

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

None under normal processing.
Fine dust dispersed in air may ignite.

Hazardous Polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Dust formation.

Incompatible materials

Incompatible with oxidizing agents; Acids.

Hazardous decomposition products

Carbon oxides. Metal oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation May be harmful by inhalation. May cause sensitization of susceptible persons. May cause irritation of respiratory tract.

Eye Contact Contact with eyes may cause irritation.

Skin Contact Irritating to skin. May cause allergic skin reaction. Repeated or prolonged contact may cause localized dermal effects including contact dermatitis, dry skin, or rash.

Ingestion May be harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing Inhalation of product dust may cause mechanical irritation to the respiratory tract leading to coughing, wheezing, or difficulty in breathing.

Delayed and immediate effects and also chronic effects from short and long term exposure

Sensitization May cause sensitization by inhalation. May cause sensitization by skin contact.

Mutagenic Effects No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Iron oxide		Group 3		
Silicon dioxide		Group 3		
Cobalt	A3	Group 2B	Reasonably Anticipated	X

Reproductive Toxicity This product does not contain any known or suspected reproductive hazards at concentrations >0.1%

STOT - single exposure None of the ingredients are known to cause specific target organ effects from a single exposure.

STOT - repeated exposure None of the ingredients are known to cause specific target organ effects through prolonged or repeated exposure.

Aspiration Hazard None of the ingredients are known to be an aspiration hazard.

Numerical measures of toxicity - Product

Acute Toxicity <1% of the mixture consists of ingredient(s) of unknown toxicity.

The following values are calculated based on chapter 3.1 of the GHS document:

LD50 Oral 2604 mg/kg; Acute toxicity estimate

LD50 Dermal 1322 mg/kg; Acute toxicity estimate

12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)

Sulfur 7704-34-9	-	LC50: 866 mg/L Brachydanio rerio 96 h static LC50: <14 mg/L Lepomis macrochirus 96 h static LC50: >180 mg/L Oncorhynchus mykiss 96 h static	-	-
Bentonite 1302-78-9		LC50 96 h: 8.0-19.0 g/L (Salmo gairdneri) LC50 96 h: = 19000 mg/L static (Oncorhynchus mykiss)		
Silicon dioxide 7631-86-9	EC50 72 h: = 440 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 5000 mg/L static (Brachydanio rerio)		EC50 48 h: = 7600 mg/L (Ceriodaphnia dubia)
Aluminum oxide 1344-28-1		LC50 96 h: > 100 mg/L semistatic (Salmo trutta)		LC50 48 h: > 100 mg/L (daphnia magna)
Cobalt 7440-48-4	-	LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	-
Phosphorus 7723-14-0	-	LC50 96 h: 0.001-0.004 mg/L static (Lepomis macrochirus) LC50 96 h: 0.0017-0.0035 mg/L flow-through (Lepomis macrochirus) LC50 96 h: 0.011-0.028 mg/L static (Pimephales promelas) LC50 96 h: 0.015-0.032 mg/L static (Oncorhynchus mykiss) LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	EC50 48 h: 0.025 - 0.037 mg/L Static (Daphnia magna) EC50 48 h: = 0.03 mg/L (Daphnia magna)
Calcium oxide 1305-78-8		LC50 96 h: = 1070 mg/L static (Cyprinus carpio)		
Lead 7439-92-1		LC50 96 h: = 0.44 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 1.17 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 1.32 mg/L static (Oncorhynchus mykiss)		EC50 48 h: = 600 µg/L (water flea)
Copper 7440-50-8	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)

Cadmium and compounds (as Cd) 7440-43-9		LC50 96 h: 0.0004-0.003 mg/L (Pimephales promelas) LC50 96 h: = 0.002 mg/L (Cyprinus carpio) LC50 96 h: = 0.003 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.006 mg/L static (Oncorhynchus mykiss) LC50 96 h: = 0.016 mg/L (Oryzias latipes) LC50 96 h: = 0.24 mg/L static (Cyprinus carpio) LC50 96 h: = 21.1 mg/L flow-through (Lepomis macrochirus) LC50 96 h: = 4.26 mg/L semi-static (Cyprinus carpio)		EC50 48 h: = 0.0244 mg/L Static (Daphnia magna)
Mercury 7439-97-6		LC50 96 h: = 0.16 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.18 mg/L static (Cyprinus carpio) LC50 96 h: = 0.5 mg/L (Cyprinus carpio) LC50 96 h: = 0.9 mg/L flow-through (Oryzias latipes)		EC50 96 h: = 5.0 µg/L (water flea)

Persistence and Degradability No information available.

Bioaccumulation No information available.

Other Adverse Effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging Do not re-use empty containers.

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Lead - 7439-92-1	(hazardous constituent - no waste number)	Included in waste streams: F035, F037, F038, F039, K002, K003, K005, K046, K048, K049, K051, K052, K061, K062, K064, K065, K066, K069, K086, K100, K176	= 5.0 mg/L regulatory level	
Arsenic - 7440-38-2		Included in waste streams: F032, F034, F035, F039, K031, K060, K084, K101, K102, K161, K171, K172, K176	5.0 mg/L regulatory level	
Cadmium and compounds (as Cd) - 7440-43-9		Included in waste streams: F006, F039, K061, K069, K100	1.0 mg/L regulatory level	
Mercury - 7439-97-6	U151	Included in waste streams: F039, K071, K106, K175	0.2 mg/L regulatory level	U151

14. TRANSPORT INFORMATION

DOT Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA All components of this product are either listed or are exempt on the TSCA inventory.

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Manganese oxide (MnO)	1344-43-0	15	1.0
Cobalt	7440-48-4	0.108	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Cobalt	7440-48-4	Carcinogen
Lead	7439-92-1	Carcinogen Developmental Female Reproductive Male Reproductive
Arsenic	7440-38-2	Carcinogen
Cadmium and compounds (as Cd)	7440-43-9	Carcinogen Developmental Male Reproductive
Mercury	7439-97-6	Developmental

U.S. State Right-to-Know Regulations

"X" designates that the ingredients are listed on the state right to know list.

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Sulfur	X	X	X		X
Manganese oxide (MnO)			X	X	
Iron oxide	X	X	X		X
Silicon dioxide	X	X	X		
Aluminum oxide	X	X	X		X
Cobalt	X	X	X	X	X

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

NFPA	**Health Hazard** 1	**Flammability** 1	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 1	**Flammability** 1	**Physical Hazard** 0	**Personal Protection** X

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General Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Resources include tests, research data, and reports believed to be credible. No guarantee is made as to accuracy or completeness. Therefore, the user assumes all risks involving the use of the product.

End of Safety Data Sheet