

Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • **Manganese Sulfide (MnS)**

Chemical Category • Manganese Compounds

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

Relevant identified use(s) • Additive in powdered metallurgical product

1.3 Details of the supplier of the safety data sheet

Manufacturer • Greenville Metals, Inc.
99 Crestview Drive – Extension
Transfer, PA 16154
United States
<http://www.pccforgedproducts.com/brands/greenville>
SDS@greenvillemetals.com

Telephone (General) • 724-509-1861

1.4 Emergency telephone number

Manufacturer • 724-509-1861 - SDS@greenvillemetals.com

Section 2: Hazards Identification

EU/EEC

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 2015/830]

2.1 Classification of the substance or mixture

CLP • Eye Irritation 2 - H319
Specific Target Organ Toxicity Repeated Exposure 1 - H372

2.2 Label Elements

CLP

DANGER



Hazard statements • H319 - Causes serious eye irritation
H372 - Causes damage to organs through prolonged or repeated exposure.

Prevention • P260 - Do not breathe dust.
P264 - Wash thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear eye/face protection , .

Response • P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.

- Storage/Disposal** • P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other Hazards

- CLP**
- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.
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United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Eye Irritation 2
 - Specific Target Organ Toxicity Repeated Exposure 1
 - Hazards Not Otherwise Classified - Health Hazards - Metal Fume Fever

2.2 Label elements

OSHA HCS 2012

DANGER



- Hazard statements** • Causes serious eye irritation
Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

- Prevention** • Do not breathe dust.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear eye/face protection , .
- Response** • IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
Get medical advice/attention if you feel unwell.
- Storage/Disposal** • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

- OSHA HCS 2012**
- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.
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Canada

According to: WHMIS 2015

2.1 Classification of the substance or mixture

- WHMIS 2015**
- Eye Irritation 2
 - Specific Target Organ Toxicity Repeated Exposure 1
 - Health Hazards Not Otherwise Classified 1

2.2 Label elements

WHMIS 2015

DANGER



- Hazard statements** • Causes serious eye irritation
 Causes damage to organs through prolonged or repeated exposure.
 Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

Precautionary statements

- Prevention** • Do not breathe dust.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Wear eye/face protection , .
- Response** • IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists: Get medical advice/attention.
 Get medical advice/attention if you feel unwell.
- Storage/Disposal** • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

WHMIS 2015

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance.

3.2 Mixtures

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Manganese Sulfide	CAS:18820-29-6 EINECS:242-599-3	92% TO 100%	NDA	EU CLP: Eye Irrit. 2, H319; STOT RE 1, H372 (CNS, Lungs / Inhl) OSHA HCS 2012: Eye Irrit. 2; STOT RE 1 (CNS, Lungs, Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever WHMIS 2015: Eye Irrit. 2; STOT RE 1 (CNS, Lungs / Inhl)	NDA
Iron	CAS:7439-89-6 EC Number:231-096-4	0% TO 8%	NDA	EU CLP: Acute Tox. 4, H302; Aquatic Chronic 4, H413 OSHA HCS 2012: Acute Tox. 4 (Orl) WHMIS 2015: Acute Tox. 4 (Orl)	NDA

See Section 16 for full text of H-statements.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.

Skin

- In case of contact with substance, immediately flush skin with running water for at

least 20 minutes. If irritation develops and persists, get medical attention.

- Eye**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.
- Ingestion**
- Rinse mouth. Do not give anything by mouth to an unconscious person. Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

- Suitable Extinguishing Media**
- LARGE FIRE: Water spray, fog or regular foam.
 - SMALL FIRES: Dry chemical, CO₂, water spray or regular foam.

- Unsuitable Extinguishing Media**
- No data available.

5.2 Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards**
- Some may burn, but none ignite readily.

- Hazardous Combustion Products**
- No data available.

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

- Personal Precautions**
- Ventilate enclosed areas. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

- Emergency Procedures**
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. Keep unauthorized personnel away.

6.2 Environmental precautions

- Avoid run off to waterways and sewers.

6.3 Methods and material for containment and cleaning up

- Containment/Clean-up Measures**
- Avoid generating dust.
 - Carefully shovel or sweep up spilled material and place in suitable container.
 - Cover powder spill with plastic sheet or tarp to minimize spreading.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

- Handling**
- Use only with adequate ventilation. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe dust. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

- Storage**
- Keep container/package tightly closed in a cool, well-ventilated place.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

- Exposure Limits/Guidelines**
- No applicable exposure limits available for product or components.

8.2 Exposure controls

- Engineering Measures/Controls**
- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment).

Personal Protective Equipment

- Respiratory**
- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134. Use a NIOSH/MSHA approved respirator if exposure limits are exceeded or symptoms are experienced.

- Eye/Face**
- Wear safety goggles.

- Skin/Body**
- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

- Environmental Exposure Controls**
- Follow best practice for site management and disposal of waste.

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Metallic gray powder with little/no odor.
Color	Metallic gray.	Odor	Little/no odor.
Odor Threshold	Data lacking		
General Properties			
Boiling Point	Data lacking	Melting Point/Freezing Point	Data lacking
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	Data lacking	Bulk Density	3.99 g/cm ³
Water Solubility	Negligible < 0.1 %	Viscosity	Data lacking
Explosive Properties	Data lacking	Oxidizing Properties:	Data lacking
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		

Flammability

Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		

Environmental

Octanol/Water Partition coefficient	Data lacking		
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9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity**10.1 Reactivity**

- Metal products themselves are not reactive, however, caution must be taken when welding due to fumes and gasses.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization not indicated.

10.4 Conditions to avoid

- Avoid generating dust.

10.5 Incompatible materials

- None

10.6 Hazardous decomposition products

- None

Section 11 - Toxicological Information**11.1 Information on toxicological effects**

Components		
Iron (0% TO 8%)	7439- 89-6	Acute Toxicity: Ingestion/Oral-Rat LD50 • 750 mg/kg; Blood:Changes in serum composition (e.g., TP, bilirubin cholesterol); Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Transaminases; Ingestion/Oral-Child TDLo • 77 mg/kg; Behavioral:Irritability; Gastrointestinal:Nausea or vomiting; Blood:Normocytic anemia; Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; Liver:Tumors; Tumorigenic:Active as anti-cancer agent; Tumorigenic:Protects against induction of experimental tumors

GHS Properties	Classification
Acute toxicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Skin corrosion/Irritation	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Serious eye damage/Irritation	EU/CLP • Eye Irritation 2 OSHA HCS 2012 • Eye Irritation 2 WHMIS 2015 • Eye Irritation 2

Skin sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Respiratory sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Aspiration Hazard	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Carcinogenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Germ Cell Mutagenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Toxicity for Reproduction	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
STOT-SE	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
STOT-RE	EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1 WHMIS 2015 • Specific Target Organ Toxicity Repeated Exposure 1

Potential Health Effects

Inhalation

Acute (Immediate)

- Exposure to dust may cause irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)

- Manganese intoxication can result in a syndrome of parkinsonism and dystonia. Prolonged exposure to the dust may cause wheezing, chest tightness, productive cough nasal irritation and symptoms of chronic respiratory disease.

Skin

Acute (Immediate)

- Exposure to dust may cause mechanical irritation.

Chronic (Delayed)

- No data available.

Eye

Acute (Immediate)

- Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)

- No data available.

Ingestion

Acute (Immediate)

- Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.

Chronic (Delayed)

- No data available.

11.2 Other information

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

Key to abbreviations

LD = Lethal Dose

TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
TDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IMO/IMDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
ADN	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
ADR/RID	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IATA/ICAO	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA

14.6 Special precautions for user

- None specified.

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

- Data lacking.

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Acute, Chronic

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Manganese Sulfide (MnS) as Manganese compounds	NDA	No	No	No	No	No
Iron	7439-89-6	Yes	No	Yes	No	Yes
Manganese Sulfide	18820-29-6	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS 1988 - Classifications of Substances

- | | | |
|--|------------|---|
| • Manganese Sulfide (MnS) as Manganese compounds | | Not Listed |
| • Iron | 7439-89-6 | Uncontrolled product according to WHMIS classification criteria |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

Canada - WHMIS 1988 - Ingredient Disclosure List

- | | | |
|--|------------|------------|
| • Manganese Sulfide (MnS) as Manganese compounds | | 1 % |
| • Iron | 7439-89-6 | Not Listed |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

Environment

Canada - CEPA - Priority Substances List

- | | | |
|--|------------|------------|
| • Manganese Sulfide (MnS) as Manganese compounds | | Not Listed |
| • Iron | 7439-89-6 | Not Listed |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

- | | | |
|--|------------|------------|
| • Manganese Sulfide (MnS) as Manganese compounds | | Not Listed |
| • Iron | 7439-89-6 | Not Listed |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

U.S. - OSHA - Specifically Regulated Chemicals

- | | | |
|--|------------|------------|
| • Manganese Sulfide (MnS) as Manganese compounds | | Not Listed |
| • Iron | 7439-89-6 | Not Listed |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

- | | | |
|--|------------|---|
| • Manganese Sulfide (MnS) as Manganese compounds | | (including any unique chemical substance that contains Manganese as part of its infrastructure) |
| • Iron | 7439-89-6 | Not Listed |
| • Manganese Sulfide | 18820-29-6 | Not Listed |

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Manganese Sulfide (MnS) as Manganese compounds		1.0 % de minimis concentration (listed under Chemical Category N450)
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

United States - California**Environment****U.S. - California - Proposition 65 - Carcinogens List**

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Manganese Sulfide (MnS) as Manganese compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Manganese Sulfide	18820-29-6	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information**Relevant Phrases (code & full text)**

- H302 - Harmful if swallowed
- H413 - May cause long lasting harmful effects to aquatic life

Revision Date

- 30/September/2016

Preparation Date

- 30/September/2016

Disclaimer/Statement of Liability

- All statements, technical information and recommendations are based on data which this company believes to be currently reliable, but no warranty of any kind is made with respect thereto. Since the company shall have no control of the use of the product described, the company assumes no liability for loss or damage incurred by proper or improper use of such product.

Key to abbreviations

NDA = No Data Available