



SAFETY DATA SHEET (SDS)

Document Number: SDS-SEL-FLUX-0001

1. IDENTIFICATION

| | |
|--|---|
| <i>Product Type:</i> | Submerged Arc Welding Flux |
| <i>Product Names:</i> | ARCFLUX BF-5.1, ARCFLUX BF-10, ARCFLUX BF-38, ARCFLUX WP-380 |
| <i>Specifications:</i> | DIN EN ISO 14174 |
| <i>Product Intended/Recommended Use:</i> | Arc welding |
| <i>Manufacturer:</i> | Bavaria Schweisstechnik GMBH Wiesenweg 23, 85716, Unterschleißheim |
| <i>Emergency Telephone Number:</i> | 3E Company Emergency Response Hotline Company Code: 334276 U.S. / Canada / Mexico: 1-866-519-4752 Europe: 1-760-476-3962 Asia Pacific: 1-760-476-3960 Middle East/Africa: 1-760-476-3959 |

2. HAZARD IDENTIFICATION

United States (US)
According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Reproductive Toxicity 2
 Specific Target Organ Toxicity Repeated Exposure 1
 Hazards Not Otherwise Classified - Health Hazards - Metal fume fever

Label elements

OSHA HCS 2012

DANGER



Hazard statements • Suspected of damaging fertility or the unborn child.
 Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention • Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.

Do not breathe dust.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Wear protective gloves/protective clothing/eye protection/face protection.

Response • IF exposed or concerned: Get medical advice/attention.
 Get medical advice/attention if you feel unwell.

Storage/Disposal • Store locked up.
 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

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.

welding can be dangerous to your health. See Section 11.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

• Material does not meet the criteria of a substance.

Mixtures

| Composition | | | | | |
|---------------------|----------------|-----------|--|--|----------|
| Chemical Name | Identifiers | % | LD50/LC50 | Classifications According to Regulation/Directive | Comments |
| Calcium fluoride | CAS:7789-75-5 | 5% TO 60% | Ingestion/Oral-Rat LD50 • 4250 mg/kg | OSHA HCS 2012: Eye Irrit. 2 | NDA |
| Manganese(II) oxide | CAS:1344-43-0 | 0% TO 35% | NDA | OSHA HCS 2012: Not Classified | NDA |
| Magnesium oxide | CAS:1309-48-4 | 0% TO 35% | NDA | OSHA HCS 2012: Hazard Not Otherwise Classified - Health Hazard - Metal fume fever | NDA |
| Calcium oxide | CAS:1305-78-8 | 0% TO 35% | NDA | OSHA HCS 2012: Skin Corr. 1C; Eye Dam. 1 | NDA |
| Alumina | CAS:1344-28-1 | 0% TO 35% | NDA | OSHA HCS 2012: STOT RE 2 (Lungs, Inhl) | NDA |
| Crystalline silica | CAS:14808-60-7 | 0% TO 30% | NDA | OSHA HCS 2012: Carc. 1A; STOT RE 1 (Lungs, Inhl) | NDA |
| Manganese dioxide | CAS:1313-13-9 | < 10% | Ingestion/Oral-Rat LD50 • 3478 mg/kg | OSHA HCS 2012: STOT RE 2 (CNS) | NDA |
| Sodium silicate | CAS:1344-09-8 | < 5% | Ingestion/Oral-Rat LD50 • 1960 mg/kg Skin-Rabbit LD50 • >4640 mg/kg | OSHA HCS 2012: Acute Tox. 4 (Orl); Skin Corr. 1; Eye Dam. 1 | NDA |
| Silicon | CAS:7440-21-3 | < 5% | Ingestion/Oral-Rat LD50 • 3160 mg/kg | OSHA HCS 2012: Flam. Sol. 2 | NDA |
| Manganese (powder) | CAS:7439-96-5 | < 5% | Ingestion/Oral-Rat LD50 • 9 g/kg | OSHA HCS 2012: Flam. Sol. 2; Comb. Dust; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs, Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever | NDA |

| | | | | | |
|------------|---------------|------|-----|---|-----|
| Iron oxide | CAS:1309-37-1 | < 5% | NDA | OSHA HCS 2012: Hazard Not Otherwise Classified - Health Hazard - Metal fume fever | NDA |
| Iron | CAS:7439-89-6 | < 5% | NDA | OSHA HCS 2012: Acute Tox. 4 (Orl) | NDA |

4. FIRST AID MEASURES

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** • Wash skin with soap and water. 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. Get medical attention immediately.
- Ingestion** • Rinse mouth. Have person sip a glass of water if able to swallow. Do not give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

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.

5. FIRE FIGHTING MEASURES

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** • Full water jet.

Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards** • The product itself does not burn. Coordinate fire-fighting measures to the fire surroundings.

- Hazardous Combustion Products** • No data available

Advice for firefighters

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

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

- Personal Precautions** • Do not walk through spilled material. Use appropriate Personal Protective Equipment (PPE)
- Emergency Procedures** • As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away.

Environmental precautions

- No special environmental measures necessary.

Methods and material for containment and cleaning up

- Containment/Clean-up Measures** • Avoid generating dust.
SMALL DRY SPILLS: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
LARGE SPILLS: Cover powder spill with plastic sheet or tarp to minimize spreading.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling • Minimize dust generation and accumulation. Use only with adequate ventilation. Wear appropriate personal protective equipment. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe dust. Avoid contact with skin, eyes, and clothing. Unprotected containers and flux packages must not be exposed to direct wetness, like snow or rain. Damaged containers must be repacked within one hour or otherwise be disposed of. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities

Storage • Keep container tightly closed. Store in a dry, well-ventilated place. A maximum of 2 pallets may be stapled onto each other.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

| Exposure Limits/Guidelines | | | | |
|---------------------------------|----------|--|---|---|
| | Result | ACGIH | NIOSH | OSHA |
| Manganese(II) oxide | Ceilings | Not established | Not established | 5 mg/m ³ Ceiling (as Mn) <i>as Manganese compounds</i> |
| | TWAs | 0.02 mg/m ³ TWA (respirable fraction, as Mn); 0.1 mg/m ³ TWA (inhalable fraction, as Mn) <i>as Manganese compounds, inorganic</i> | 1 mg/m ³ TWA (as Mn) <i>as Manganese compounds</i> | Not established |
| | STELs | Not established | 3 mg/m ³ STEL (as Mn) <i>as Manganese compounds</i> | Not established |
| Calcium oxide (1305-78-8) | TWAs | 2 mg/m ³ TWA | 2 mg/m ³ TWA | 5 mg/m ³ TWA |
| Magnesium oxide (1309-48-4) | TWAs | 10 mg/m ³ TWA (inhalable fraction) | Not established | 15 mg/m ³ TWA (fume, total particulate) |
| Alumina (1344-28-1) | TWAs | 1 mg/m ³ TWA (respirable fraction) <i>as Aluminum insoluble compounds</i> | Not established | 15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction) |
| Crystalline silica (14808-60-7) | TWAs | 0.025 mg/m ³ TWA (respirable fraction) | 0.05 mg/m ³ TWA (respirable dust) | Not established |
| Manganese (powder) (7439-96-5) | Ceilings | Not established | Not established | 5 mg/m ³ Ceiling (fume) |
| | TWAs | 0.02 mg/m ³ TWA (respirable fraction); 0.1 mg/m ³ TWA (inhalable fraction) | 1 mg/m ³ TWA (fume) | Not established |
| | STELs | Not established | 3 mg/m ³ STEL | Not established |
| Iron oxide (1309-37-1) | TWAs | 5 mg/m ³ TWA (respirable fraction) | 5 mg/m ³ TWA (dust and fume, as Fe) | 10 mg/m ³ TWA (fume); 15 mg/m ³ TWA (total dust, listed under Rouge); 5 mg/m ³ TWA |

| | | | | |
|---------------------|------|-----------------|--|--|
| | | | | (respirable fraction, listed under Rouge) |
| Silicon (7440-21-3) | TWAs | Not established | 10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable dust) | 15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction) |

Exposure Limits Supplemental

OSHA

•Crystalline silica (14808-60-7): **Mineral Dusts:** ((30)/(%SiO₂ + 2) mg/m³ TWA, total dust; (250)/(%SiO₂ + 5) mppcf TWA, respirable fraction; (10)/(%SiO₂ + 2) mg/m³ TWA, respirable fraction)

Exposure controls

Engineering

Measures/Controls

- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. 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

- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

STEL = Short Term Exposure Limits are based on 15-minute exposures

NIOSH = National Institute of Occupational Safety and Health

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

OSHA = Occupational Safety and Health Administration

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on Physical and Chemical Properties

| Material Description | | | |
|-------------------------------------|-------------------|------------------------------|-------------------------|
| Physical Form | Solid | Appearance/Description | Grey to brown granules. |
| Color | Grey to brown. | Odor | No data available |
| Odor Threshold | No data available | | |
| General Properties | | | |
| Boiling Point | No data available | Melting Point/Freezing Point | > 1300 °C(> 2372 °F) |
| Decomposition Temperature | No data available | pH | No data available |
| Specific Gravity/Relative Density | No data available | Water Solubility | Negligible < 0.1 % |
| Viscosity | No data available | | |
| Volatility | | | |
| Vapor Pressure | No data available | Vapor Density | No data available |
| Evaporation Rate | No data available | | |
| Flammability | | | |
| Flash Point | No data available | UEL | No data available |
| LEL | No data available | Autoignition | No data available |
| Flammability (solid, gas) | No data available | | |
| Environmental | | | |
| Octanol/Water Partition coefficient | No data available | | |

10.

11. STABILITY AND REACTIVITY

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- Avoid generating dust.

Incompatible materials

- None known.

Hazardous decomposition products

- No decomposition according to intended use.

12. TOXICOLOGICAL INFORMATION

Information on toxicological effects

| | | Components |
|--------------------------------|------------|---|
| Crystalline silica (0% TO 30%) | 14808-60-7 | <p>Acute Toxicity: Inhalation-Human TCLo • 16 mppcf 8 Hour(s) 17.9 Year(s)-Intermittent; <i>Lungs, Thorax, or Respiration:</i>Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Cough; <i>Lungs, Thorax, or Respiration:</i>Dyspnea; Inhalation-Rat TCLo • 200 mg/kg; <i>Lungs, Thorax, or Respiration:</i>Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Other changes; <i>Nutritional and Gross Metabolic:Changes in Chemistry or Temperature:</i>Fe;</p> <p>Multi-dose Toxicity: Inhalation-Hamster TCLo • 3 mg/m³ 6 Hour(s) 78 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:</i>Fibrosis (interstitial); Lungs, Thorax, or Respiration:Changes in lung weight; Inhalation-Rat TCLo • 6.2 mg/m³ 6 Hour(s) 6 Week(s)-Intermittent; <i>Lungs, Thorax, or</i></p> |

| | | |
|------------------------------|-----------|---|
| | | <p><i>Respiration:Other changes; Blood:Changes in spleen; Immunological Including Allergic:Increase in cellular immune response; Inhalation-Rat TCLo • 80 mg/m³ 26 Week(s)-Intermittent; Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Blood:Changes in spleen; Immunological Including Allergic:Decrease in cellular immune response;</i></p> <p>Mutagen: Micronucleus test • Unreported Route-Hamster • Lung (Somatic cell) • 160 µg/cm³; DNA damage • Unreported Route-Human • Other Cell Type • 120 mg/L 24 Hour(s); Micronucleus test • Unreported Route-Human • Lung (Somatic cell) • 40 µg/cm³;</p> <p>Tumorigen / Carcinogen: Inhalation-Rat TCLo • 50 mg/m³ 6 Hour(s) 71 Week(s)-Intermittent; <i>Tumorigenic:Carcinogenic by RTECS criteria; Liver:Tumors</i></p> |
| Alumina (0% TO 35%) | 1344-28-1 | <p>Multi-dose Toxicity: Inhalation-Rat TCLo • 200 mg/m³ 5 Hour(s) 28 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Structural or functional change in trachea or bronchi; Lungs, Thorax, or Respiration:Chronic pulmonary edema; Related to Chronic Data:Death in the Other Multiple Dose data type field</i></p> |
| Manganese dioxide (< 10%) | 1313-13-9 | <p>Acute Toxicity: Ingestion/Oral-Rat LD50 • 3478 mg/kg; Ingestion/Oral-Rat TDLo • 100 mg/kg; <i>Brain and Coverings:Other degenerative changes; Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Phosphatases;</i></p> <p>Mutagen: Micronucleus test • Ingestion/Oral-Rat • 1000 mg/kg; Cytogenetic analysis • Ingestion/Oral-Rat • 1000 mg/kg</p> |
| Magnesium oxide (0% TO 35%) | 1309-48-4 | <p>Multi-dose Toxicity: Inhalation-Rat TCLo • 1000 mg/m³ 4 Hour(s) 50 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Other changes; Blood:Other hemolysis with or without anemia</i></p> |
| Calcium fluoride (5% TO 60%) | 7789-75-5 | <p>Acute Toxicity: Ingestion/Oral-Rat LD50 • 4250 mg/kg; <i>Behavioral:Somnolence (general depressed activity); Behavioral:Ataxia; Lungs, Thorax, or Respiration:Respiratory depression;</i></p> <p>Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 44 g/kg 31 Day(s)-Intermittent; <i>Cardiac:EKG changes not diagnostic of above; Musculoskeletal:Changes in teeth and supporting structures; Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Transaminases;</i></p> <p>Reproductive: Intraperitoneal-Mouse TDLo • 3200 mg/kg (9D preg); <i>Reproductive Effects:Effects on Fertility:Post-implantation mortality; Intraperitoneal-Mouse TDLo • 67200 mg/kg (1-21D preg); Reproductive Effects:Specific Developmental Abnormalities:Other developmental abnormalities</i></p> |
| Sodium silicate (< 5%) | 1344-09-8 | <p>Acute Toxicity: Ingestion/Oral-Rat LD50 • 1960 mg/kg; Skin-Rabbit LD50 • >4640 mg/kg; <i>Behavioral:Somnolence (general depressed activity); Lungs, Thorax, or Respiration:Dyspnea;</i></p> <p>Irritation: Eye-Rabbit • 10 mg 24 Hour(s) • Severe irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Severe irritation</p> |
| Iron oxide (< 5%) | 1309-37-1 | <p>Acute Toxicity: Inhalation-Rat TCLo • 50 mg/m³ 60 Hour(s); <i>Behavioral:Excitement; Behavioral:Fluid intake; Gastrointestinal:Hypermotility, diarrhea; Inhalation-Rat TCLo • 0.8 mg/kg; Lungs, Thorax, or Respiration:Emphysema; Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Multiple enzyme effects; Biochemical:Metabolism (intermediary):Effect on inflammation or mediation of inflammation;</i></p> <p>Multi-dose Toxicity: Inhalation-Rat TCLo • 500 µg/m³ 24 Hour(s) 61 Day(s)-Continuous; <i>Brain and Coverings:Other degenerative changes; Blood:Changes in serum composition (e.g., TP, bilirubin cholesterol); Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:True cholinesterase</i></p> |
| Iron (< 5%) | 7439-89-6 | <p>Acute Toxicity: Ingestion/Oral-Rat LD50 • 750 mg/kg; <i>Blood:Changes in serum composition (e.g., TP, bilirubin cholesterol); Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Transaminases;</i> Ingestion/Oral-Child TDLo • 77 mg/kg; <i>Behavioral:Irritability; Gastrointestinal:Nausea or vomiting; Blood:Normocytic anemia;</i></p> <p>Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; <i>Liver:Tumors; Tumorigenic:Active as anti-cancer agent; Tumorigenic:Protects against induction of experimental tumors</i></p> |
| Manganese (powder) (< 5%) | 7439-96-5 | <p>Acute Toxicity: Ingestion/Oral-Rat LD50 • 9 g/kg; Inhalation-Man TCLo • 2300 µg/m³; <i>Brain and Coverings:Other degenerative changes; Behavioral:Changes in motor activity (specific assay); Behavioral:Muscle weakness;</i></p> <p>Irritation: Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation;</p> <p>Multi-dose Toxicity: Inhalation-Human TCLo • 0.5 mg/m³ 39 Week(s)-Intermittent; <i>Brain and</i></p> |

| | | |
|----------------|-----------|--|
| | | <i>Coverings:Other degenerative changes; Peripheral Nerve and Sensation:Sensory change involving peripheral nerve; Behavioral:Irritability; Inhalation-Mouse TCLO • 0.7 mg/m³ 24 Hour(s) 22 Week(s)-Continuous; Lungs, Thorax, or Respiration:Fibrosis (interstitial); Immunological Including Allergic:Decrease in cellular immune response; Inhalation-Rat TCLO • 0.3 mg/m³ 5 Hour(s) 26 Week(s)-Intermittent; Lungs, Thorax, or Respiration:Fibrosis (interstitial); Immunological Including Allergic:Decrease in cellular immune response; Reproductive: Ingestion/Oral-Mouse TDLo • 322.5 mg/kg (43D male); Reproductive Effects:Paternal Effects:Spermatogenesis; Ingestion/Oral-Rat TDLo • 50 mg/kg (20D post); Reproductive Effects:Specific Developmental Abnormalities:Central nervous system; Reproductive Effects:Effects on Newborn:Biochemical and metabolic; Reproductive Effects:Effects on Newborn:Behavioral</i> |
| Silicon (< 5%) | 7440-21-3 | Acute Toxicity: Ingestion/Oral-Rat LD50 • 3160 mg/kg; Irritation: Eye-Rabbit • 3 mg • Mild irritation |

| GHS Properties | Classification |
|-------------------------------|--|
| Acute toxicity | OSHA HCS 2012•No data available |
| Skin corrosion/Irritation | OSHA HCS 2012•No data available |
| Serious eye damage/Irritation | OSHA HCS 2012•No data available |
| Skin sensitization | OSHA HCS 2012•No data available |
| Respiratory sensitization | OSHA HCS 2012•No data available |
| Aspiration Hazard | OSHA HCS 2012•No data available |
| Carcinogenicity | OSHA HCS 2012•No data available |
| Germ Cell Mutagenicity | OSHA HCS 2012•No data available |
| Toxicity for Reproduction | OSHA HCS 2012•Toxic to Reproduction 2 |
| STOT-SE | OSHA HCS 2012•No data available |
| STOT-RE | OSHA HCS 2012•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) • Repeated and prolonged exposure to dust may cause lung effects including pneumoconiosis.

Skin

Acute (Immediate) • Exposure to dust may cause mechanical irritation.

Chronic (Delayed) • No data available

Eye

Acute (Immediate) • Exposure to dust may cause mechanical irritation. 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

Carcinogenic Effects • Silica present in welding fumes is in the amorphous state, i.e. in non-crystalline, non-fibratic form and is therefore not considered to be dangerous.

| Carcinogenic Effects | | | |
|-----------------------------|------------|----------------------|------------------------|
| | CAS | IARC | NTP |
| Crystalline silica | 14808-60-7 | Group 1-Carcinogenic | Known Human Carcinogen |

Reproductive Effects • Repeated and prolonged exposure may cause reproductive effects.

Other information

- Heating above the melting point releases metallic oxides which may cause metal fume fever which is an influenza like illness. Symptoms include headache, metallic taste in the mouth, cough, thirst, throat irritation, shortness of breath, fever, sweating and pain in the limbs. This illness is not permanent and recovery usually occurs within 24-48 hours after onset.

Key to abbreviations

LD = Lethal Dose

TC = Toxic Concentration

TD = Toxic Dose

13. ECOLOGICAL INFORMATION

Toxicity

- No known significant effects or critical hazards.

Persistence and degradability

- Due to its low solubility in water the product is almost completely mechanically separated in biological sewage plants. The methods for determining the biological degradability are not applicable to inorganic substances. Readily eliminated from water.

Bioaccumulative potential

- No data available

Mobility in Soil

- No known significant effects or critical hazards.

Other adverse effects

- No known significant effects or critical hazards.

14. DISPOSAL CONSIDERATIONS

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.

15. TRANSPORT INFORMATION

| | UN number | UN proper shipping name | Transport hazard class(es) | Packing group | Environmental hazards |
|-----|----------------|-------------------------|----------------------------|----------------|-----------------------|
| DOT | Not Applicable | Not Regulated | Not Applicable | Not Applicable | NDA |

Special precautions for user

• None specified.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • No data available

16. REGULATORY INFORMATION

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

SARA Hazard Classifications

• Chronic

| Component | CAS | Inventory | |
|---------------------|------------|-----------|------|
| | | | TSCA |
| Alumina | 1344-28-1 | Yes | |
| Calcium fluoride | 7789-75-5 | Yes | |
| Calcium oxide | 1305-78-8 | Yes | |
| Crystalline silica | 14808-60-7 | Yes | |
| Iron | 7439-89-6 | Yes | |
| Iron oxide | 1309-37-1 | Yes | |
| Magnesium oxide | 1309-48-4 | Yes | |
| Manganese (powder) | 7439-96-5 | Yes | |
| Manganese dioxide | 1313-13-9 | Yes | |
| Manganese(II) oxide | 1344-43-0 | Yes | |
| Silicon | 7440-21-3 | Yes | |
| Sodium silicate | 1344-09-8 | Yes | |

United States

Labor

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

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - OSHA - Specifically Regulated Chemicals

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

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

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

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

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

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

| | | |
|----------------------|-----------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |

| | | |
|--|------------|--|
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - CERCLA/SARA - Section 313 - Emission Reporting | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | 1.0 % de minimis concentration |
| •Alumina | 1344-28-1 | 1.0 % de minimis concentration (fibrous forms) |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |

| | | |
|---------------------|------------|------------|
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

| | | |
|----------------------|------------|--|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | carcinogen, 10/1/1988 (airborne particles of respirable size) |

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

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

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

| | | |
|----------------------|------------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

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

| | | |
|----------------------|-----------|------------|
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |

| | | |
|--|------------|------------|
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Female | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Male | | |
| •Manganese(II) oxide | 1344-43-0 | Not Listed |
| •Calcium fluoride | 7789-75-5 | Not Listed |
| •Calcium oxide | 1305-78-8 | Not Listed |
| •Iron oxide | 1309-37-1 | Not Listed |
| •Magnesium oxide | 1309-48-4 | Not Listed |
| •Manganese (powder) | 7439-96-5 | Not Listed |
| •Alumina | 1344-28-1 | Not Listed |
| •Silicon | 7440-21-3 | Not Listed |
| •Manganese dioxide | 1313-13-9 | Not Listed |
| •Iron | 7439-89-6 | Not Listed |
| •Sodium silicate | 1344-09-8 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer.

17. OTHER INFORMATION

DISCLAIMER: Users should take all standard and reasonable precautions when using this product for its intended use. The manufacturer does not recommend this product for any uses other than that described. The manufacturer makes no claims and provides no warranty for non-standard use.

SDS Revisions

| | | | | | |
|-------------------|----------|----------------|-----------|------------------|---|
| Preparation date: | 6/9/2016 | Revision date: | 6/22/2016 | Revision number: | 1 |
|-------------------|----------|----------------|-----------|------------------|---|

Note: Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, Select Arc makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Select Arc be responsible for damages of any nature whatsoever resulting from the use of, misuse or reliance upon information. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or any other nature are made hereunder with respect to information or the product to which information refers. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure its activities comply with federal, State, Provincial, and local laws and regulations.