1. Identification

Product identifier: REYNODUAL / REYNOBOND NC

Other means of identification

- SDS number: 1522
- Version #: 01
- Revision date: August 22, 2014.

Recommended use: Architectural/building materials

Recommended restrictions: None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

- Arconic Inc.
  201 Isabella Street
  Pittsburgh, PA 15212-5858
  Health and Safety Tel: +1-412-553-4649
  Health and Safety Fax: +1-412-553-4822
  Health and Safety Email: SDSInfo@arconic.com

- Reynolds Metals Company dba Arconic Architectural Products
  50 Industrial Boulevard
  Eastman, GA 31023
  Tel: +1-478-374-4746

Emergency Information

- CHEMTREC: +1-703-527-3887 +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); Arconic: +1-412-553-4001 (24 Hour Emergency Telephone, only English spoken)

Website

For a current Safety Data Sheet, refer to Arconic websites: www.arconic.com or internally at my.arconic.com EHS Community

2. Hazard(s) identification

Potential health effects

When used as intended, this product is an article and should not pose any health hazard. The health effects listed below should not occur unless improper processing or installation of this product generates dust or fumes. This product is not intended to be sanded or ground and should not be shaved, sanded, ground or otherwise altered. The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

- Physical hazards: Not classified.
- Health hazards: Not classified.
- Environmental hazards: Not classified.
- OSHA defined hazards: Combustible dust

Label elements

Signal word: Danger

Hazard statement: May form combustible dust concentrations in air. May cause damage to organs by inhalation. May damage fertility.
Precautionary statement

Prevention
Obtain special instructions before use. Do not breathe dust/fume. Prevent dust accumulation to minimize explosion hazard.

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

Storage
Store in a dry place.

Disposal
Dispose in accordance with all applicable regulations.

Hazard(s) not otherwise classified (HNOC)
None known.

Supplemental information
None.

Specific hazards
May be a potential hazard under the following conditions:
- Dust or fines are dispersed in air.
- Chips, dust or fines are in contact with water.
- Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).
- Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Small chips, fine turnings, and dust from processing may be readily ignitable.
Combustion of the coatings can generate toxic and irritating gases.

3. Composition/information on ingredients

Composition comments
Complete composition is provided below and may include some components classified as non-hazardous.

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>&lt;80</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>7439-95-4</td>
<td>&lt;6</td>
<td></td>
</tr>
<tr>
<td>Resin</td>
<td>Various*</td>
<td>&lt;2.0</td>
<td></td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>&lt;1.5</td>
<td></td>
</tr>
<tr>
<td>Colorant</td>
<td>Various*</td>
<td>&lt;1.0</td>
<td></td>
</tr>
<tr>
<td>Adhesive</td>
<td>Not available</td>
<td>&lt;0.1</td>
<td></td>
</tr>
</tbody>
</table>

Additional Information
* - Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Eye contact
Dust in the eyes: Rinse eyes with plenty of water or saline for at least 15 minutes. If eye irritation persists, get medical advice/attention.

Skin contact
Dust from processing: Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Inhalation
Dust or fume from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Get medical attention, if needed.

Ingestion
Not relevant, due to the form of the product.

Most important symptoms/effects, acute and delayed
Health effects from mechanical processing (e.g., cutting, grinding): Dust from processing: May cause eye/skin irritation. Can cause irritation of the upper respiratory tract.
Additional health effects from elevated temperature processing (e.g., welding, melting): Dust and fumes from processing: 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. See Section 11 of the SDS for additional information on health hazards.

Medical conditions aggravated by exposure
Dust from processing: Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.

Indication of immediate medical attention and special treatment needed
If breathing is difficult, give oxygen.

General information
IF exposed or concerned: Get medical advice/attention.
5. Fire-fighting measures

Suitable extinguishing media
Use Class D extinguishing agents on fines, dust or molten metal.
Use coarse water spray on chips and turnings.
Apply extinguishing media carefully to avoid creating airborne dust.

Unsuitable extinguishing media
DO NOT USE halogenated extinguishing agents on small chips/fines.
DO NOT USE water in fighting fires around molten metal.
These fire extinguishing agents will react with the burning material.

Specific hazards arising from the chemical
May be a potential hazard under the following conditions:
• Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
• Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.
• Dust and fines in contact with certain metal oxides (e.g., rust, copper oxide). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermite reactions/explosions.

Hazardous combustion products
Coatings: Combustion can generate toxic and irritating gases.

Special protective equipment and precautions for firefighters
Firefighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

Fire fighting equipment/instructions
Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Apply extinguishing media carefully to avoid creating airborne dust.
Avoid water in straight hose stream; will scatter and spread fire.

General fire hazards
This product does not present fire or explosion hazards as shipped. Small chips, fine turnings, and dust from processing may be readily ignitable.

Explosion data
Sensitivity to mechanical impact
Not sensitive.

Sensitivity to static discharge
Take precautionary measures against static discharges when there is a risk of dust explosion.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Avoid generating dust. Avoid contact with sharp edges. Use personal protection recommended in Section 8 of the SDS.

Personal precautions, protective equipment and emergency procedures for emergency responders
Avoid generating dust. Avoid contact with sharp edges. Use personal protection recommended in Section 8 of the SDS.

Evacuation procedures
None necessary.

Methods and materials for containment and cleaning up
If molten: Use dry sand to contain the flow of material. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

Environmental precautions
No special environmental precautions required.

7. Handling and storage

Handling
Avoid generating dust. Avoid contact with sharp edges or heated metal. Minimize dust generation and accumulation. Combustible dust clouds may be created where operations produce fine material (dust). Hot and cold aluminum are not visually different. Use personal protection recommended in Section 8 of the SDS.

Storage
No special storage precautions noted.
If processing of this product generates dust or if extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) brochures listed in Section 16.

Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Avoid all ignition sources. Good housekeeping practices must be maintained. Do not use compressed air to remove settled material from floors, beams or equipment.

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

All tooling, containers, molds and ladles which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated.

Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

- Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large items adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal temperature of the coldest item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.

Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

8. Exposure controls/personal protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>U.S. - OSHA Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (CAS 7429-90-5)</td>
<td>TWA</td>
<td>5 mg/m3</td>
<td>Respirable fraction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg/m3</td>
<td>Total dust</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese (CAS 7439-96-5)</td>
<td>Ceiling</td>
<td>5 mg/m3</td>
<td>Fume.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (CAS 7429-90-5)</td>
<td>TWA</td>
<td>1 mg/m3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Manganese (CAS 7439-96-5)</td>
<td>TWA</td>
<td>0.1 mg/m3</td>
<td>Inhalable fraction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.02 mg/m3</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>
Arconic Components | Type | Value | Form |
--- | --- | --- | --- |
Aluminum (CAS 7429-90-5) | TWA | 3 mg/m³ | Respirable fraction |
 | | 10 mg/m³ | Total dust |
Manganese (CAS 7439-96-5) | TWA | 0.05 mg/m³ | Total dust |
 | | 0.02 mg/m³ | Respirable fraction |

**General**
Personnel who handle and work with molten metal should utilize primary protective clothing like polycarbonate face shields, fire resistant tapper's jackets, neck shades (snoods), leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal. Synthetic materials should never be worn even as secondary clothing (undergarments).

**Appropriate engineering controls**
If dust is generated through processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

**Individual protection measures, such as personal protective equipment**

- **Eye/face protection**
  Wear safety glasses with side shields.

- **Skin protection**
  - **Hand protection**
    Avoid contact with sharp edges. Wear appropriate gloves to avoid any skin injury.
  - **Other**
    Not available.

- **Respiratory protection**
  Dust from processing: Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8. Suggested respiratory protection: N95.

- **Thermal hazards**
  When material is heated, wear gloves to protect against thermal burns. Contact with molten material can cause thermal burns.

**General hygiene considerations**
Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls**
Follow standard monitoring procedures.

**9. Physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form</strong></td>
<td>Solid, panels.</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Metallic.</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Odorless</td>
</tr>
<tr>
<td><strong>Odor threshold</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>Not determined</td>
</tr>
<tr>
<td><strong>Melting point/freezing point</strong></td>
<td>Not determined / 1236.97 °F (669.43 °C) estimated</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>Not determined</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Upper/lower flammability or explosive limits**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flammability limit - upper (%)</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Flammability limit - lower (%)</strong></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Explosive properties**
Dust clouds may be explosive.

**Dust explosion properties**

- **St class**
  3 Very strong explosion. estimated

**Vapor pressure**
Not applicable

**Vapor density**
Not applicable

**Relative density**
Not determined
**Solubility(ies)**
- Insoluble

**Partition coefficient (n-octanol/water)**
- Not applicable

**Auto-ignition temperature**
- Not applicable

**Decomposition temperature**
- Not applicable

**Viscosity**
- Not applicable

**Viscosity temperature**
- Not applicable

10. **Stability and reactivity**

**Reactivity**
- The product is stable and non-reactive under normal conditions of use, storage and transport.

**Chemical stability**
- Stable under normal conditions of use, storage, and transportation.

**Possibility of hazardous reactions**
- Hazardous polymerization does not occur.

**Conditions to avoid**
- Chips, fines, dust and molten metal are considerably more reactive with the following:
  - Heat: Oxidizes at a rate dependent upon temperature and particle size.
  - Water: Slowly generates flammable and explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Water/aluminum mixtures may be hazardous when confined.

**Incompatible materials**
- Chips, fines, dust and molten metal are considerably more reactive with the following:
  - Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
  - Acids and alcalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
  - Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum.
  - Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation.
  - Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).

**Hazardous decomposition products**
- Combustion of the coatings can generate carbon monoxide, carbon dioxide and aldehydes.

11. **Toxicological information**

**Health effects associated with ingredients**
- The following health effects are not likely to occur unless sawing or cutting generates dust or unless material is heated to melting.

  **Aluminum dust/fines and fumes**: Low health risk by inhalation. Generally considered to be biologically inert (milling, cutting, grinding).

  When the paint is dried and cured, the colorants/pigments in this material are bound into the cured resin and will not be released through skin contact or under anticipated conditions of use. However, if the cured material is processed in such a manner (i.e., grinding) that large quantities of fine dusts are generated or the cured material is burned, a potential for exposure to dust containing the colorants/pigments may be created.

**Health effects associated with compounds formed during processing**
- No new/additional compounds are expected to be formed during processing.

**Information on likely routes of exposure**

**Eye contact**
- Dust and fumes from processing: Can cause irritation.

**Skin contact**
- Can cause irritation.

**Inhalation**
- Product as shipped: No adverse effects due to inhalation are expected. Dust and fumes from processing: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

  Additional health effects from elevated temperature processing (e.g., welding, melting): 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.

**Ingestion**
- Not relevant, due to the form of the product.
Symptoms related to the physical, chemical and toxicological characteristics

Dust and fumes from processing: May cause eye or skin irritation with susceptible persons.
Manganese dust or fumes: Chronic overexposures: Can cause inflammation of the lung tissues, scarring of the lungs (pulmonary fibrosis), central nervous system damage, Secondary Parkinson's Disease and reproductive harm in males.

Additional health effects from elevated temperature processing (e.g., welding, melting): 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.

Information on toxicological effects

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (CAS 7429-90-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>&gt; 10000 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td><strong>Acute toxicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-classified. Based on available data, the classification criteria are not met.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skin corrosion/irritation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-corrosive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serious eye damage/eye irritation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust in the eyes will cause irritation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory or skin sensitization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory sensitization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not a respiratory sensitizer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skin sensitization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust and fume from processing: May cause irritation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Germ cell mutagenicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contains no ingredient listed as a mutagen.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neurological effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product as shipped: Not applicable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pre-existing conditions aggravated by exposure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust and fume from processing: Chronic exposure: May cause central nervous system effects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carcinogenicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contains no ingredient listed as a carcinogen</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACGIH Carcinogens</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum (CAS 7429-90-5)</td>
<td>A4 Not classifiable as a human carcinogen.</td>
<td></td>
</tr>
<tr>
<td>Manganese (CAS 7439-96-5)</td>
<td>A4 Not classifiable as a human carcinogen.</td>
<td></td>
</tr>
<tr>
<td><strong>IARC Monographs. Overall Evaluation of Carcinogenicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not listed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>US OSHA Hazard Categories (10)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not regulated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>US OSHA Hazard Categories (9)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not regulated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>US. National Toxicology Program (NTP) Report on Carcinogens</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not listed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not regulated.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproductive toxicity

Product as shipped: This product is not expected to cause reproductive or developmental effects. Dust or fume from processing: Chronic exposure: Can present a reproductive hazard for males (Manganese).

Routes of exposure

Inhalation. Skin contact.

Specific target organ toxicity - single exposure

Dust and fumes from processing: 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.

Specific target organ toxicity - repeated exposure

Dust and fume from processing: Chronic overexposures: May cause damage to organs (Central Nervous System) through prolonged or repeated exposure by inhalation. May cause damage to organs (lungs) through prolonged or repeated exposure by inhalation.

Aspiration hazard

Not applicable.
Chronic effects

Product as shipped: This product is considered an article and does not pose any health hazard under normal conditions of use.

Dust or fume from processing: Manganese dust or fumes: Chronic overexposures: Can cause inflammation of the lung tissues, scarring of the lungs (pulmonary fibrosis), central nervous system damage, Secondary Parkinson's Disease and reproductive harm in males.

Further information

None known.

12. Ecological information

Ecotoxicity

Not expected to be harmful to aquatic organisms.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese (CAS 7439-96-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td>EC50</td>
<td>40 mg/l, 48 hours</td>
</tr>
</tbody>
</table>

Persistence and degradability

The product is not biodegradable.

Bioaccumulative potential

The product is not bioaccumulating.

Mobility in soil

Not considered mobile.

Mobility in general

Not considered mobile.

Other adverse effects

None known.

13. Disposal considerations

Disposal instructions

Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Waste codes

RCRA Status: Not federally regulated in the U.S. if disposed of "as is." RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S.

Waste from residues / unused products

Dispose of in accordance with local regulations.

Contaminated packaging

Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

ID number -
Proper shipping name Not regulated
Hazard class -
Packing group -

General Shipping Notes

* When "Not regulated", enter the proper freight classification, SDS Number and Product Name onto the shipping paperwork.

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards and special precautions. Otherwise, it is presumed that the information is not available/not relevant.

15. Regulatory information

US federal regulations

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

- TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
  Not regulated.
- CERCLA Hazardous Substance List (40 CFR 302.4)
  Manganese (CAS 7439-96-5) Listed.
- US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
  Not regulated.
- US OSHA Hazard Categories (9)
  Not regulated.
- US OSHA Hazard Categories (10)
  Not regulated.
Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312 Hazardous chemical
Yes

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>&lt;1.5</td>
</tr>
</tbody>
</table>

US state regulations

US. California Proposition 65
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*"Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).
*"No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

SDS Status
August 22, 2014: New SDS.
Hazardous Materials Control Committee
+1-412-553-4649

Revision date
August 22, 2014.

Version #
01

Further information
Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.

Disclaimer
The information in the sheet was written based on the best knowledge and experience currently available.
Other information

• Guide to Occupational Exposure Values 2016, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
• expub, Expert Publishing, LLC., www.expub.com,
• Ariel, 3E Company, www.3Ecompany.com
• NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
• NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
• NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
• NFPA 77, Standard for Static Electricity

Key/Legend:

ACGIH American Conference of Governmental Industrial Hygienists
AICS Australian Inventory of Chemical Substances
CAS Chemical Abstract Services
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
CFR Code of Federal Regulations
CPR Cardio-pulmonary Resuscitation
DOT Department of Transportation
DSL Domestic Substances List (Canada)
EC Effective Concentration
ED Effective Dose
EINECS European Inventory of Existing Commercial Chemical Substances
ENCS Japan - Existing and New Chemical Substances
EWC European Waste Catalogue
EPA Environmental Protective Agency
IARC International Agency for Research on Cancer
LC Lethal Concentration
LD Lethal Dose
MAK Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL Non-Domestic Substances List (Canada)
NIOSH National Institute for Occupational Safety and Health
NTP National Toxicology Program
OEL Occupational Exposure Limit
OSHA Occupational Safety and Health Administration
PIN Product Identification Number
PMCC Pensky Marten Closed Cup
RCRA Resource Conservation and Recovery Act
SARA Superfund Amendments and Reauthorization Act
SIMDUT Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL Short Term Exposure Limit
TCLP Toxic Chemicals Leachate Program
TDG Transportation of Dangerous Goods
TLV Threshold Limit Value
TSCA Toxic Substances Control Act
TWA Time Weighted Average
WHMIS Workplace Hazardous Materials Information System
m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of SDS ***
Hazard statement
May form combustible dust concentrations in air. May cause damage to organs by inhalation. May damage fertility.

Precautionary statement
Prevention
Obtain special instructions before use. Do not breathe dust/fume. Prevent dust accumulation to minimize explosion hazard.
Response
If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.
Storage
Store in a dry place.
Disposal
Dispose in accordance with all applicable regulations.
Supplemental information
Small chips, fine turnings and dust from processing may be readily ignitable. Explosion/fire hazards may be present when:
• Dust or fines are dispersed in air.
• Chips, dust or fines are in contact with water.
• Dust and fines from processing are in contact with certain metal oxides (e.g., rust, copper oxide).
• Molten metal is in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

FIRE FIGHTING MEASURES: Use Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and turnings.
DO NOT USE halogenated extinguishing agents on small chunks, dust or fines.
DO NOT USE water in fighting fires around molten metal.
These fire extinguishing agents will react with the burning material. Thermal decomposition of coatings can generate toxic and irritating gases.

IN CASE OF SPILL: Collect scrap for recycling. If molten: Use dry sand to contain the flow of material. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

See Arconic SDS Number 1522.