

| | | |
|--------|-----------|-----|
| Cobalt | 7440-48-4 | < 1 |
| Lead | 7439-92-1 | < 1 |

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

**Iron oxide is formed at temperatures above the melting point. The product is an alloy. At temperatures above the melting point steel products may liberate fumes containing oxides of iron and alloying elements.

4. First-aid measures

Inhalation

In case of inhalation of fumes from heated product: Move into fresh air and keep at rest. Get medical attention if symptoms persist. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration.

Skin contact

Wash skin with soap and water. In case of burns with hot metal, rinse with plenty of cold water. If burns are severe, consult a physician. If skin irritation or an allergic skin reaction develops, get medical attention.

Eye contact

Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention promptly if symptoms persist or occur after washing.

Ingestion

Solid steel: Not applicable. Dust: Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed

High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in the mouth, dryness, and irritation of the throat, followed by weakness, muscle pain, fever, and chills.

5. Fire-fighting measures

Suitable extinguishing media

No unusual fire or explosion hazards noted. Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media

None known.

Specific hazards arising from the chemical

No unusual fire or explosion hazards noted.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions

Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Cold solid metal: No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the SDS for additional personal protection advice when handling this product. Hot metal: Avoid contact with hot material. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

Not applicable. Collect for recycling.

Environmental precautions

No specific precautions.

7. Handling and storage

Precautions for safe handling

Oil coating can make material slippery. (If applied) Avoid contact with sharp edges and hot surfaces. Use appropriate gloves and tools to ensure safe handling. Use work methods which minimize dust/fume production. Observe safety measures suited to the coating(s) when handling, cutting or melting. Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute). Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store away from incompatible materials, such as strong acids and oxidizers (See Section 10).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

| Components | Type | Value |
|-------------------------|------|------------|
| Arsenic (CAS 7440-38-2) | TWA | 0.01 mg/m3 |
| Lead (CAS 7439-92-1) | TWA | 0.05 mg/m3 |

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| Components | Type | Value | Form |
|---------------------------|---------|-----------|----------------|
| Carbon (CAS 1333-86-4) | PEL | 3.5 mg/m3 | |
| Chromium (CAS 7440-47-3) | PEL | 1 mg/m3 | |
| Cobalt (CAS 7440-48-4) | PEL | 0.1 mg/m3 | Dust and fume. |
| Copper (CAS 7440-50-8) | PEL | 1 mg/m3 | Dust and mist. |
| | | 0.1 mg/m3 | Fume. |
| Manganese (CAS 7439-96-5) | Ceiling | 5 mg/m3 | Fume. |
| Nickel (CAS 7440-02-0) | PEL | 1 mg/m3 | |

US. ACGIH Threshold Limit Values

| Components | Type | Value | Form |
|--------------------------|------|------------|---------------------|
| Arsenic (CAS 7440-38-2) | TWA | 0.01 mg/m3 | |
| Carbon (CAS 1333-86-4) | TWA | 3.5 mg/m3 | Inhalable fraction. |
| Chromium (CAS 7440-47-3) | TWA | 0.5 mg/m3 | |
| Cobalt (CAS 7440-48-4) | TWA | 0.02 mg/m3 | |
| Lead (CAS 7439-92-1) | TWA | 0.05 mg/m3 | |
| Nickel (CAS 7440-02-0) | TWA | 1.5 mg/m3 | Inhalable fraction. |

US. NIOSH: Pocket Guide to Chemical Hazards

| Components | Type | Value | Form |
|---------------------------|---------|-------------|----------------|
| Arsenic (CAS 7440-38-2) | Ceiling | 0.002 mg/m3 | |
| Carbon (CAS 1333-86-4) | TWA | 3.5 mg/m3 | |
| Chromium (CAS 7440-47-3) | TWA | 0.5 mg/m3 | |
| Cobalt (CAS 7440-48-4) | TWA | 0.05 mg/m3 | Dust and fume. |
| Copper (CAS 7440-50-8) | TWA | 1 mg/m3 | Dust and mist. |
| Lead (CAS 7439-92-1) | TWA | 0.05 mg/m3 | |
| Manganese (CAS 7439-96-5) | STEL | 3 mg/m3 | Fume. |
| | TWA | 1 mg/m3 | Fume. |
| Nickel (CAS 7440-02-0) | TWA | 0.015 mg/m3 | |

Biological limit values

ACGIH Biological Exposure Indices

| Components | Value | Determinant | Specimen | Sampling Time |
|-------------------------|----------|---|----------|---------------|
| Arsenic (CAS 7440-38-2) | 35 µg/l | Inorganic arsenic, plus methylated metabolites, as As | Urine | * |
| Lead (CAS 7439-92-1) | 300 µg/l | Lead | Blood | * |

* - For sampling details, please see the source document.

Exposure guidelines

**Iron oxide is formed at temperatures above the melting point.

Appropriate engineering controls

Adequate ventilation should be provided so that exposure limits are not exceeded. Use local exhaust when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Individual protection measures, such as personal protective equipment

Eye/face protection

Use of safety glasses or goggles is required for welding, burning, sawing, brazing, grinding or machining operations. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection

Hand protection

Wear protective gloves. While handling product and/or steel packing material wear cut resistant gloves and sleeves for laceration protection.

Other

Wear suitable protective clothing.

| | |
|---------------------------------------|--|
| Respiratory protection | Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. |
| Thermal hazards | When material is heated, wear gloves to protect against thermal burns. Thermally protective apron and long sleeves are recommended when volume of hot material is significant. |
| General hygiene considerations | Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements. |

9. Physical and chemical properties

Appearance

| | |
|--|--|
| Physical state | Solid. |
| Form | 7x7" Billets, 10x14" Blooms, Sized round bars, Sized round cornered square bars. |
| Color | Metallic gray. |
| Odor | None. |
| Odor threshold | Not available. pH |
| | Not available. |
| Melting point/freezing point | 2750 °F (1510 °C) |
| Initial boiling point and boiling range | Not available. |
| Flash point | Not available. |
| Evaporation rate | Not available. |
| Flammability (solid, gas) | Not available. |

Upper/lower flammability or explosive limits

| | |
|---------------------------------------|----------------|
| Flammability limit - lower (%) | Not available. |
| Flammability limit - upper (%) | Not available. |
| Explosive limit - lower (%) | Not available. |
| Explosive limit - upper (%) | Not available. |

| | |
|-------------------------|----------------|
| Vapor pressure | Not available. |
| Vapor density | Not available. |
| Relative density | Not available. |

Solubility(ies)

| | |
|--|----------------|
| Solubility (water) | Insoluble. |
| Partition coefficient (n-octanol/water) | Not available. |
| Auto-ignition temperature | Not available. |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |

Other information

| | |
|-----------------------------|----------------|
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing. |

10. Stability and reactivity

| | |
|---|---|
| Reactivity Chemical stability | Stable at normal conditions. |
| Possibility of hazardous reactions | This product is stable under expected conditions of use. Reacts with acids and oxidizing agents. |
| Conditions to avoid | Contact with incompatible materials. Acids. Oxidizing agents. |
| Incompatible materials | Strong acids. Oxidizing agents. |
| Hazardous decomposition products | At elevated temperatures: Acid fumes. Metallic fumes. Strong Acid Contact: Hydrogen. |

11. Toxicological information

Information on likely routes of exposure

| | |
|---------------------|---|
| Inhalation | No inhalation hazard under normal conditions. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. |
| Skin contact | Under normal conditions of intended use, this material does not pose a risk to health. Dust may irritate skin. Skin contact may aggravate an existing dermatitis. Contact with hot material can cause thermal burns which may result in permanent damage. |
| Eye contact | Under normal conditions of intended use, this material does not pose a risk to health. Contact with hot material can cause thermal burns which may result in permanent damage. Grinding and sanding this product may generate dust. Dust may irritate the eyes. |
| Ingestion | Solid steel: Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting. |

Symptoms related to the physical, chemical and toxicological characteristics

Exposed individuals may experience eye tearing, redness, and discomfort. May dry the skin leading to discomfort and dermatitis. High concentrations of dust may irritate throat and respiratory system and cause coughing. Exposed individuals may experience eye tearing, redness, and discomfort.

Information on toxicological effects

| | |
|-----------------------|--|
| Acute toxicity | Inhalation of dust (generated at high temperatures only) may cause mild irritation of the upper respiratory tract. Prolonged contact may cause redness, irritation and cracking. Welding, cutting and metalizing can generate ozone. Ozone can cause irritation of eyes, nose and respiratory tract. |
|-----------------------|--|

| Components | Species | Test Results |
|--|---|----------------------|
| Arsenic (CAS 7440-38-2) | | |
| Acute | | |
| <i>Oral</i> | | |
| LD50 | Mouse | 145 mg/kg |
| | Rat | 763 mg/kg |
| Copper (CAS 7440-50-8) | | |
| Acute | | |
| <i>Inhalation</i> | | |
| LC50 | Rat | > 2.77 mg/l, 4 hours |
| <i>Oral</i> | | |
| LD50 | Rat | 481 mg/kg |
| Manganese (CAS 7439-96-5) | | |
| Acute | | |
| <i>Inhalation</i> | | |
| LC50/LC90 | Rat | > 1500 mg/kg |
| <i>Oral</i> | | |
| LD50 | Rat | 9000 mg/kg |
| Skin corrosion/irritation | Dust may irritate skin. | |
| Serious eye damage/eye irritation | Dust may irritate the eyes. | |
| Respiratory or skin sensitization | | |
| Respiratory sensitization | No data available. | |
| Skin sensitization | Contains nickel: May cause an allergic skin reaction. | |
| Germ cell mutagenicity | No data available. | |
| Carcinogenicity | Nickel is listed by IARC (Group 2B) and NTP. A residual chrome VI compound from the surface coating is water soluble and is carcinogenic. Chromium VI compounds are regarded as human carcinogens by IARC, NTP, OSHA and ACGIH. | |

IARC Monographs. Overall Evaluation of Carcinogenicity

| | |
|--------------------------|---|
| Arsenic (CAS 7440-38-2) | 1 Carcinogenic to humans. |
| Carbon (CAS 1333-86-4) | 2B Possibly carcinogenic to humans. |
| Chromium (CAS 7440-47-3) | 3 Not classifiable as to carcinogenicity to humans. |
| Cobalt (CAS 7440-48-4) | 2B Possibly carcinogenic to humans. |

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

2B Possibly carcinogenic to humans.
1 Carcinogenic to humans.

NTP Report on Carcinogens

Arsenic (CAS 7440-38-2)
Nickel (CAS 7440-02-0)

Known To Be Human Carcinogen.
Reasonably Anticipated to be a Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Arsenic (CAS 7440-38-2)

Cancer

Reproductive toxicity No data available.

Specific target organ toxicity - single exposure No data available.

Specific target organ toxicity - repeated exposure No data available.

Aspiration hazard Not relevant, due to the form of the product.

Chronic effects Frequent inhalation of dust over a long period of time increases the risk of developing lung diseases. The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals in contact with skin. The ingredients of the alloy are bound within the product and release is not expected under normal conditions.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Inhalation of high concentrations of iron oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Exposure to manganese fume/dust can affect the central nervous system (apathy, drowsiness, weakness and other chronic symptoms such as postural tremors). Pre-existing skin and respiratory conditions including dermatitis, asthma and chronic lung disease might be aggravated by exposure.

12. Ecological information

Ecotoxicity The environmental hazard of the product is considered to be limited.

| Components | Species | Test Results |
|--------------------------|---------|---|
| Chromium (CAS 7440-47-3) | | |
| Aquatic | | |
| Fish | LC50 | Fathead minnow (<i>Pimephales promelas</i>) 10 - 100 mg/l, 96 Hours |
| Iron (CAS 7439-89-6) | | |
| Aquatic | | |
| Fish | LC50 | Channel catfish (<i>Ictalurus punctatus</i>) > 500 mg/l, 96 Hours |
| Lead (CAS 7439-92-1) | LC50 | Rainbow trout, donaldson trout (<i>Oncorhynchus mykiss</i>) 1.17 mg/l, 96 Hours |

Persistence and degradability No data available.

Bioaccumulative potential No data available on bioaccumulation.

Mobility in soil Not relevant, due to the form of the product.

Other adverse effects The product is not expected to be hazardous to the environment.

13. Disposal considerations

Disposal instructions Dispose waste and residues in accordance with applicable federal, state, and local regulations. Recover and recycle, if practical.

Hazardous waste code Not applicable.

Waste from residues / unused products Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal. Recover and recycle, if practical.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT Not regulated as dangerous goods.

IATA Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

| | |
|-------------------------|------------------------|
| Arsenic (CAS 7440-38-2) | Cancer |
| Lead (CAS 7439-92-1) | Reproductive toxicity |
| Arsenic (CAS 7440-38-2) | Liver |
| Lead (CAS 7439-92-1) | Central nervous system |
| Arsenic (CAS 7440-38-2) | Skin |
| Lead (CAS 7439-92-1) | Kidney |
| Arsenic (CAS 7440-38-2) | Respiratory irritation |
| Lead (CAS 7439-92-1) | Blood |
| Arsenic (CAS 7440-38-2) | Nervous system |
| Lead (CAS 7439-92-1) | Acute toxicity |
| Arsenic (CAS 7440-38-2) | Acute toxicity |

CERCLA Hazardous Substance List (40 CFR 302.4)

| | |
|---------------------------|--------|
| Arsenic (CAS 7440-38-2) | LISTED |
| Chromium (CAS 7440-47-3) | LISTED |
| Cobalt (CAS 7440-48-4) | LISTED |
| Copper (CAS 7440-50-8) | LISTED |
| Lead (CAS 7439-92-1) | LISTED |
| Manganese (CAS 7439-96-5) | LISTED |
| Nickel (CAS 7440-02-0) | LISTED |

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

| Chemical name | CAS number | % by wt. |
|---------------|------------|----------|
| Chromium | 7440-47-3 | < 14 |
| Manganese | 7439-96-5 | < 5 |
| Nickel | 7440-02-0 | < 4 |
| Copper | 7440-50-8 | < 1.5 |
| Arsenic | 7440-38-2 | < 1 |
| Cobalt | 7440-48-4 | < 1 |
| Lead | 7439-92-1 | < 1 |

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Arsenic (CAS 7440-38-2)
Chromium (CAS 7440-47-3)
Cobalt (CAS 7440-48-4)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.**US state regulations** WARNING: This product contains chemical(s) known to the State of California to cause cancer.**US. Massachusetts RTK - Substance List**

Arsenic (CAS 7440-38-2)
 Carbon (CAS 1333-86-4)
 Chromium (CAS 7440-47-3)
 Cobalt (CAS 7440-48-4)
 Copper (CAS 7440-50-8)
 Lead (CAS 7439-92-1)
 Manganese (CAS 7439-96-5)
 Nickel (CAS 7440-02-0)

US. New Jersey Worker and Community Right-to-Know Act

Arsenic (CAS 7440-38-2)
 Carbon (CAS 1333-86-4)
 Chromium (CAS 7440-47-3)
 Copper (CAS 7440-50-8)
 Lead (CAS 7439-92-1)
 Manganese (CAS 7439-96-5)
 Nickel (CAS 7440-02-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Arsenic (CAS 7440-38-2)
 Carbon (CAS 1333-86-4)
 Chromium (CAS 7440-47-3)
 Cobalt (CAS 7440-48-4)
 Copper (CAS 7440-50-8)
 Lead (CAS 7439-92-1)
 Manganese (CAS 7439-96-5)
 Nickel (CAS 7440-02-0)

US. Rhode Island RTK

Arsenic (CAS 7440-38-2)
 Chromium (CAS 7440-47-3)
 Cobalt (CAS 7440-48-4)
 Copper (CAS 7440-50-8)
 Lead (CAS 7439-92-1)
 Manganese (CAS 7439-96-5)
 Nickel (CAS 7440-02-0)

US. California Proposition 65**US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance**

Arsenic (CAS 7440-38-2)
 Carbon (CAS 1333-86-4)
 Cobalt (CAS 7440-48-4)
 Lead (CAS 7439-92-1)
 Nickel (CAS 7440-02-0)

International Inventories

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|----------------------|--|------------------------|
| Australia | Australian Inventory of Chemical Substances (AICS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | No |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|---|------------------------|
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "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

| | |
|----------------------------|---|
| Issue date | 17-June-2015 |
| Revision date | - |
| Version # | 01 |
| Further information | NFPA Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe |
| HMIS® ratings | Health: 2* Flammability: 0 Physical hazard: 0 |

NFPA ratings



Disclaimer

Steel Dynamics® Engineered BAR Products cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.