SAFETY DATA SHEET

NI-332 products

Section 1. Identification

NI-332 products

- **GHS product identifier**: NI-332 products
- **Other means of identification**: NI-332 (036081), NI-332-1 (ZNI332-01), NI-332-4 (ZNI332-04)
- **Product type**: Powder.

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

Not applicable.

**Supplier's details**
Praxair Surface Technologies, Inc.
1555 Main Street
Indianapolis, IN 46224
USA
317-240-2650

**Emergency telephone number (with hours of operation)**
317-240-2484 7:00am - 3:30pm ET Mon-Fri
Chemtrec: 1-800-424-9300

Section 2. Hazards identification

**OSHA/HCS status**: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture**: CARCINOGENICITY - Category 2

**GHS label elements**

- **Signal word**: Warning
- **Hazard pictograms**: 
  ![Pictogram]
- **Hazard statements**: Suspected of causing cancer.
- **Precautionary statements**
  - **Prevention**: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.
  - **Response**: IF exposed or concerned: Get medical attention.
  - **Storage**: Store locked up.
  - **Disposal**: Dispose of contents and container in accordance with all local, regional, national and international regulations.
  - **Hazards not otherwise classified**: Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat.

Section 3. Composition/information on ingredients

- **Substance/mixture**: Substance
- **Other means of identification**: NI-332 (036081), NI-332-1 (ZNI332-01), NI-332-4 (ZNI332-04)
- **CAS number/other identifiers**
  - **CAS number**: Not available.
  - **Product code**: NI-332 products
Section 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni-332 products</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Nickel</td>
<td>50 - 75</td>
<td>7440-02-0</td>
</tr>
<tr>
<td>cobalt</td>
<td>5 - 20</td>
<td>7440-48-4</td>
</tr>
<tr>
<td>chromium</td>
<td>5 - 20</td>
<td>7440-47-3</td>
</tr>
<tr>
<td>titanium</td>
<td>1 - 5</td>
<td>7440-32-6</td>
</tr>
<tr>
<td>tungsten</td>
<td>1 - 5</td>
<td>7440-33-7</td>
</tr>
<tr>
<td>molybdenum</td>
<td>1 - 5</td>
<td>7439-99-7</td>
</tr>
<tr>
<td>Aluminum</td>
<td>1 - 5</td>
<td>91728-14-2</td>
</tr>
<tr>
<td>silicon</td>
<td>1 - 5</td>
<td>7440-21-3</td>
</tr>
<tr>
<td>boron</td>
<td>&lt;1</td>
<td>7440-42-8</td>
</tr>
<tr>
<td>carbon</td>
<td>&lt;1</td>
<td>7440-44-0</td>
</tr>
<tr>
<td>Zirconium</td>
<td>&lt;1</td>
<td>7440-67-7</td>
</tr>
</tbody>
</table>

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Inhalation: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact: No known significant effects or critical hazards.

Ingestion: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following: irritation redness
Section 4. First aid measures

Inhalation: Adverse symptoms may include the following:
- Respiratory tract irritation
- Coughing

Skin contact: No specific data.

Ingestion: No specific data.

Protection of first-aiders:
No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Notes to physician:
Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments:
No specific treatment.

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

Section 5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical:
No specific fire or explosion hazard.

Hazardous thermal decomposition products:
Decomposition products may include the following materials:
- Metal oxide/oxides

Special protective actions for fire-fighters:
Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters:
Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:
No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders:
If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions:
Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up:

Small spill:
Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor.
Section 6. Accidental release measures

**Large spill**

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

**Precautions for safe handling**

**Protective measures**

Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene**

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities**

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

**Storage**

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>ACGIH TLV (United States, 6/2013). TWA: 1.5 mg/m³ 8 hours. Form: Inhalable fraction</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL 1989 (United States, 3/1989). TWA: 1 mg/m³, (as Ni) 8 hours.</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 10/2013). TWA: 0.015 mg/m³, (as Ni) 10 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013). TWA: 1 mg/m³, (as Ni) 8 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL 1989 (United States, 3/1989). Notes: as Co TWA: 0.05 mg/m³, (as Co) 8 hours.</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 2/2013). Notes: as Co TWA: 0.1 mg/m³, (as Co) 8 hours.</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 10/2013). Notes: as Co TWA: 0.05 mg/m³, (as Co) 10 hours. Form: Dust and fumes</td>
</tr>
<tr>
<td>Cobalt</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Section 8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>chromium</td>
<td>TWA: 0.02 mg/m³, (as Co) 8 hours. Form: Inorganic</td>
<td>TWA: 0.5 mg/m³, (measured as Cr) 8 hours.</td>
<td>TWA: 0.5 mg/m³ 8 hours.</td>
<td>TWA: 1 mg/m³, (as Cr) 8 hours.</td>
</tr>
<tr>
<td>tungsten</td>
<td>TWA: 5 mg/m³, (as W) 8 hours. STEL: 10 mg/m³, (as W) 15 minutes.</td>
<td>TWA: 10 mg/m³, (as W) 10 hours. STEL: 10 mg/m³, (as W) 15 minutes.</td>
<td>TWA: 5 mg/m³, (as W) 10 hours. STEL: 10 mg/m³, (as W) 15 minutes.</td>
<td>TWA: 5 mg/m³, (as W) 10 hours. STEL: 10 mg/m³, (as W) 15 minutes.</td>
</tr>
<tr>
<td>molybdenum</td>
<td>TWA: 3 mg/m³, (as Mo) 8 hours. Form: Inhalable fraction</td>
<td>TWA: 10 mg/m³, (as Mo) 8 hours. Form: Respirable fraction</td>
<td>TWA: 5 mg/m³, (as Mo) 10 hours. Form: Respirable fraction</td>
<td>TWA: 10 mg/m³, (as Mo) 10 hours. Form: Respirable fraction</td>
</tr>
<tr>
<td>Aluminum</td>
<td>TWA: 1 mg/m³ 8 hours. Form: Respirable fraction</td>
<td>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction</td>
<td>TWA: 5 mg/m³ 10 hours. Form: Respirable fraction</td>
<td>TWA: 5 mg/m³ 8 hours. Form: Total dust</td>
</tr>
<tr>
<td>Zirconium</td>
<td>ACGIH TLV (United States, 6/2013).</td>
<td>TWA: 5 mg/m³, (as Zr) 8 hours. STEL: 10 mg/m³, (as Zr) 15 minutes.</td>
<td>OSHA PEL 1989 (United States, 3/1989).</td>
<td>NIOSH REL (United States, 10/2013).</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Environmental exposure controls**: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**
Section 8. Exposure controls/personal protection

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. If operating conditions cause high dust concentrations to be produced, use dust goggles.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state: Solid. [Powder.]
Color: Gray.
Odor: Odorless
Odor threshold: Not available.
pH: Not available.
Melting point: 1455 to 1900°C (2651 to 3452°F)
Boiling point: Not available.
Flash point: Not available.
Evaporation rate: Not available.
Flammability (solid, gas): Not available.
Lower and upper explosive (flammable) limits: Not available.
VOC content: 0 lbs/gal (0 g/l)
Vapor pressure: Not available.
Vapor density: Not available.
Relative density: Not available.
Solubility: Insoluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water: Not available.
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.
Viscosity: Not available.
Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>silicon</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3160 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>boron</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>650 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>tungsten</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>silicon</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>3 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>-</td>
<td>2B</td>
<td>NTP</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
</tr>
<tr>
<td>cobalt</td>
<td>-</td>
<td>2B</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>chromium</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

7/10/2014. NI-332 products 7/12
Section 11. Toxicological information

Not available.

Information on the likely routes of exposure

- Not available.

Potential acute health effects

- **Eye contact**: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.
- **Inhalation**: Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
- **Skin contact**: No known significant effects or critical hazards.
- **Ingestion**: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

- **Eye contact**: Adverse symptoms may include the following: irritation, redness.
- **Inhalation**: Adverse symptoms may include the following: respiratory tract irritation, coughing.
- **Skin contact**: No specific data.
- **Ingestion**: No specific data.

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

**Short term exposure**

- **Potential immediate effects**: Not available.
- **Potential delayed effects**: Not available.

**Long term exposure**

- **Potential immediate effects**: Not available.
- **Potential delayed effects**: Not available.

Potential chronic health effects

Not available.

- **General**: Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
- **Carcinogenicity**: Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
- **Mutagenicity**: No known significant effects or critical hazards.
- **Teratogenicity**: No known significant effects or critical hazards.
- **Developmental effects**: No known significant effects or critical hazards.
- **Fertility effects**: No known significant effects or critical hazards.

Numerical measures of toxicity

**Acute toxicity estimates**

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>13693.3 mg/kg</td>
</tr>
</tbody>
</table>
Section 12. Ecological information

Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>Acute EC50 2 ppm Marine water</td>
<td>Algae - Macrocystis pyrifera - Young</td>
<td>4 days</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 450 µg/l Fresh water</td>
<td>Aquatic plants - Lemna minor</td>
<td>4 days</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 1000 µg/l Marine water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute IC50 0.31 mg/l Marine water</td>
<td>Crustaceans - Americamysis bahia - Juvenile (Fledgling, Hatchling, Weanling)</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 47.5 ng/L Fresh water</td>
<td>Fish - Heteropeustes fossils</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 100 mg/l Marine water</td>
<td>Algae - Glenodinium halli</td>
<td>72 hours</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Acute LC50 4400 µg/l</td>
<td>Fish - Cyprinus carpio</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 3.4 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 0.2 ppm Marine water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 5 ppm Marine water</td>
<td>Algae - Bacillariophyta</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 35000 µg/l Fresh water</td>
<td>Algae - Macrocytis pyrifera - Young</td>
<td>4 days</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 45 µg/l Fresh water</td>
<td>Aquatic plants - Lemna minor</td>
<td>4 days</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 22 µg/l Fresh water</td>
<td>Crustaceans - Ceriodaphnia reticulata</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 13.9 ppm Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 50 mg/l Marine water</td>
<td>Fish - Anguilla rostrata</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 0.19 µg/l Fresh water</td>
<td>Algae - Glenodinium halli</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 200000 µg/l</td>
<td>Fish - Cyprinus carpio</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 800 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 500 mg/l Marine water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 60000 µg/l Fresh water</td>
<td>Algae - Glenodinium halli</td>
<td>72 hours</td>
</tr>
</tbody>
</table>

Persistence and degradability

Not available.

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>-</td>
<td>15600</td>
<td>high</td>
</tr>
<tr>
<td>Titanium</td>
<td>-</td>
<td>34 to 352</td>
<td>low</td>
</tr>
<tr>
<td>Silicon</td>
<td>57 to 77</td>
<td>-</td>
<td>high</td>
</tr>
</tbody>
</table>

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
## Section 14. Transport information

<table>
<thead>
<tr>
<th></th>
<th>DOT Classification</th>
<th>TDG Classification</th>
<th>Mexico Classification</th>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Environmental hazards</strong></td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Reportable quantity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Transport in bulk: Not available.

## Section 15. Regulatory information

### U.S. Federal regulations

- **Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)**: Listed
- **Clean Air Act Section 602 Class I Substances**: Not listed
- **Clean Air Act Section 602 Class II Substances**: Not listed

United States inventory (TSCA 8b): Not determined. Clean Water Act (CWA) 307: Nickel; chromium

- **TSCA 8(a) PAIR**: tungsten
- **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

- **Clean Water Act (CWA) Section 307**: Nickel; chromium

- **Clean Air Act Section 112**: Listed

NI-332 products

7/10/2014.
Section 15. Regulatory information

DEA List I Chemicals (Precursor Chemicals) : Not listed
DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304
Composition/information on ingredients
No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312
Classification : Delayed (chronic) health hazard

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni-332 products</td>
<td>100</td>
<td>50 - 75</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
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<tr>
<td>Nickel</td>
<td></td>
<td>50 - 75</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
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<tr>
<td>cobalt</td>
<td></td>
<td>5 - 20</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
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<tr>
<td>tungsten</td>
<td></td>
<td>1 - 5</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>silicon</td>
<td></td>
<td>1 - 5</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>boron</td>
<td></td>
<td>&lt;1</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

SARA 313

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form R - Reporting requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>50 - 75</td>
</tr>
<tr>
<td>cobalt</td>
<td>7440-48-4</td>
<td>5 - 20</td>
</tr>
<tr>
<td>chromium</td>
<td>7440-47-3</td>
<td>5 - 20</td>
</tr>
<tr>
<td>Supplier notification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>50 - 75</td>
</tr>
<tr>
<td>cobalt</td>
<td>7440-48-4</td>
<td>5 - 20</td>
</tr>
<tr>
<td>chromium</td>
<td>7440-47-3</td>
<td>5 - 20</td>
</tr>
</tbody>
</table>

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; COBALT; CHROMIUM; TUNGSTEN; MOLYBDENUM; SILICON DUST
New York : The following components are listed: Nickel; Chromium
New Jersey : The following components are listed: NICKEL; COBALT; CHROMIUM; TITANIUM; TUNGSTEN; MOLYBDENUM; SILICON
Pennsylvania : The following components are listed: NICKEL; COBALT FUME; CHROMIUM; TUNGSTEN; MOLYBDENUM; SILICON

California Prop. 65
WARNING: This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>Yes</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>cobalt</td>
<td>Yes</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

Canada inventory : Not determined.

International regulations
Section 15. Regulatory information

International lists

Australia inventory (AICS): Not determined.
China inventory (IECSC): Not determined.
Japan inventory: Not determined.
Korea inventory: Not determined.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals: Not listed
Chemical Weapons Convention List Schedule II Chemicals: Not listed
Chemical Weapons Convention List Schedule III Chemicals: Not listed

Section 16. Other information

History
Date of printing: 7/10/2014.
Date of issue/Date of revision: 7/10/2014.

Key to abbreviations
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations

References: Not available.

Notice to reader
To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.