SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
Product name: LaserForm® Maraging steel
Product type: Solid. [Metallic powder.]

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

Identified uses
For use with 3D Systems DMP (Direct Metal Printing) equipment.

Uses advised against
Any other uses.

1.3 Details of the supplier of the data sheet
3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina
U.S.A.
Phone: 803.326.3900 or Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7
United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
Phone: +61 3 9819-4422
e-mail: moreinfo@3dsystems.com

3D Systems Japan K.K.
Ebisu Garden Place Tower 27F
4-20-3, Ebisu, Shibuya-ku,
Tokyo 50-6027 Japan
Phone: +81-3-5798-2800
e-mail: moreinfo@3dsystems.com

1.4 Emergency telephone number:
USA
Chemical Emergency: 800.424.9300 – Chemtrec

Europe
Chemical Emergency: +1 703.527.3887 - Chemtrec

Australia
Chemical Emergency: +(61) 29037.2994 – Aus Chemtrec

Japan
Chemical Emergency: +(81)-345209637 – Chemtrec

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

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

2.1.1 Classification

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Category</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>EYE IRRITATION</td>
<td>2A</td>
<td>H319</td>
</tr>
<tr>
<td>RESPIRATORY SENSITIZATION</td>
<td>1</td>
<td>H334</td>
</tr>
<tr>
<td>SKIN SENSITIZATION</td>
<td>1</td>
<td>H317</td>
</tr>
<tr>
<td>CARCINOGENICITY</td>
<td>2</td>
<td>H351</td>
</tr>
<tr>
<td>TOXIC TO REPRODUCTION (Fertility)</td>
<td>2</td>
<td>H361f</td>
</tr>
<tr>
<td>SPECIFIC TARGET ORGAN TOXICITY</td>
<td>1</td>
<td>H372</td>
</tr>
<tr>
<td>(REPEATED EXPOSURE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQUATIC HAZARD (ACUTE)</td>
<td>1</td>
<td>H401</td>
</tr>
<tr>
<td>AQUATIC HAZARD (LONG-TERM)</td>
<td>2</td>
<td>H411</td>
</tr>
</tbody>
</table>

2.2 Label Elements

Hazard pictograms:

Signal word: Danger

Hazard statements:

H317 : May cause an allergic skin reaction.
H319 : Causes serious eye irritation.
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H351 : Suspected of causing cancer.
H372 : Causes damage to organs through prolonged or repeated exposure.
H361f : Suspected of damaging fertility.
H400 : Very toxic to aquatic life
H411 : Toxic to aquatic life with long lasting effects.
Precautionary statements:
P201 : Obtain special instructions before use.
P202 : Do not handle until all safety precautions have been read and understood.
P260 : Do not breathe dust.
P264 : Wash hands thoroughly after handling.
P270 : Do not eat, drink or smoke when using this product.
P272 : Contaminated work clothing should not be allowed out of the workplace.
P273 : Avoid release to the environment.
P280 : Wear protective gloves, protective clothing and eye protection or face protection.
P284 : Wear respiratory protection.
P302+P352 : IF ON SKIN: Wash with plenty of soap and water.
P304+P340 : IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 : IF exposed or concerned: Get medical advice/attention.
P314 : Get medical attention if you feel unwell.
P333+P313 : If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 : If eye irritation persists: Get medical advice/attention.
P342+P311 : If experiencing respiratory symptoms: Call a POISON CENTER or physician.
P362+P364 : Take off contaminated clothing. And wash it before reuse.
P391 : Collect spillage.
P405 : Store locked up.
P501 : Dispose of contents and container in accordance with all local, regional, national and international regulations.

2.3 Other Hazards which do not result in classification:
None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Mixture

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Reach No</th>
<th>CAS-No</th>
<th>EC-No</th>
<th>%</th>
<th>Classification according to Reg. (EC) No. 1272/2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>01-2119462838-24</td>
<td>7439-89-6</td>
<td>231-096-4</td>
<td>48.5-79.5</td>
<td>Not classified</td>
</tr>
<tr>
<td>Nickel</td>
<td>01-2119438727-29</td>
<td>7440-02-0</td>
<td>231-111-4</td>
<td>10-30</td>
<td>Skin send. 1, H317 Car. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412</td>
</tr>
<tr>
<td>Cobalt</td>
<td>7440-48-4</td>
<td></td>
<td></td>
<td>7-13</td>
<td>Acute Tox. 4, H332 Ey Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 1, H350i Repr. 2 H361f Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410 (M=1)</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>01-2119472304-43</td>
<td>7439-98-7</td>
<td>231-107-2</td>
<td>3.7</td>
<td>Not classified</td>
</tr>
<tr>
<td>Titanium</td>
<td>7440-32-6</td>
<td>231-142-3</td>
<td></td>
<td>0.5-1.5</td>
<td>Flam. Sol. 2, H228</td>
</tr>
</tbody>
</table>

Any concentration shown as a range is to protect confidentiality or is due to batch variation.
See section 16 for the full text of the H statements declared above.

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

4.1 Description of first aid measures

- **Following 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.

- **Following inhalation:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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 necessary, call a poison center or physician. 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. In the event of any complaints or symptoms, avoid further exposure.

- **Following skin contact:** Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

- **Following 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.

- **Protection of the first aider:** No action shall be taken involving any personal risk or without suitable training. If it suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

**Potential acute health effects**

- **Eye contact:** Causes serious eye irritation.

- **Inhalation:** Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

- **Skin Contact:** May cause an allergic skin reaction.

- **Ingestion:** No known significant effects or critical hazards.

**Over-exposure signs/symptoms**

- **Eye contact:** Adverse symptoms may include the following: pain or irritation, watering and redness.

- **Inhalation:** Adverse symptoms may include the following: respiratory tract irritation, coughing, wheezing and breathing difficulties, asthma, reduced fetal weight, an increase in fetal deaths, skeletal malformations.

- **Skin contact:** Adverse symptoms may include the following: Irritation, redness, reduced fetal weight, increase in foetal deaths, skeletal malformations.

- **Ingestion:** Adverse symptoms may include the following: reduced fetal weight, increase in fetal deaths, skeletal malformations.

**Long term exposure**

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

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

4.3 Indications of any immediate medical attention and special treatment needed

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

- **Specific treatment:** No specific treatment.
SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media:

- Suitable extinguishing media: Use approved type D extinguisher or smother with dry sand, dry clay or dry ground limestone.
- Unsuitable extinguishing media: Do not use water nor high volume water jets. Do not use dry chemical, Carbon dioxide (CO₂) or Halon.

5.2 Special hazards arising from the substance or mixture

- Hazards from the substance or mixture: This material is very toxic to aquatic life. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous thermal decomposition products: Decomposition products may include the following materials: metal oxide/oxides

5.3 Advise for firefighters:

- Special protective actions for firefighters: 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 firefighters: 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

6.1 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”.

6.2 Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, or soil). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

6.3 Methods and material for containment and cleaning up

- For containment: Use non-sparking antistatic tools and containers. Do not use compressed air and avoid dust generation.
- For cleaning up small spillage: Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- For cleaning up large spillage: Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach the 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.

6.4 Reference to other sections

- See Section 1 for emergency contact information.
- See section 8 for information on appropriate personal protective equipment.
- See section 13 for additional waste treatment information.
SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

- **Protective measures:** Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitisation problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Avoid release to the environment. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. 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. Remove contaminated clothing and protective equipment before entering eating areas. Avoid contact with skin and eyes. Do not breathe dust. Wash hands and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. 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. Eliminate all ignition sources. Separate from oxidizing materials. 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 container to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

- **Recommendations:** Not available.
- **Industrial sector specific Solutions** Not available.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nickel</strong></td>
<td>ACGIH TLV (United States, 4/2014). Notes: Refers to Appendix A -- Carcinogens. Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM–TLVs) for those materials that are hazardous when deposited anywhere in the respiratory tract. 1998 Adoption. TWA: 1.5 mg/m³ 8 hours. Form: Inhalable fraction OSHA PEL (United States, 2/2013). Notes: as Ni TWA: 1 mg/m³, (as Ni) 8 hours. NIOSH REL (United States, 10/2013). TWA: 0.015 mg/m³, (as Ni) 10 hours.</td>
</tr>
</tbody>
</table>

| **Cobalt**              | ACGIH TLV (United States, 3/2016). TWA: 0.02 mg/m³, (as Co) 8 hours. TWA: 0.005 mg/m³ 8 hours. Form: Thoracic fraction NIOSH REL (United States, 10/2013). TWA: 0.05 mg/m³, (as Co) 10 hours. Form: Dust and fumes OSHA PEL (United States, 6/2016). TWA: 0.1 mg/m³, (as Co) 8 hours. |
8.2 Exposure controls
8.2.1 Appropriate engineering controls
Technical measures to prevent exposure
Ensure adequate ventilation to maintain exposures below occupational limits. Whenever possible the use of local exhaust explosion proof ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Do not blow dust off clothing or skin with compressed air.

8.2.2 Personel Protection equipment
8.2.2.1 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. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.2.2.2 Eye and face protection
Safety glasses or goggles are recommended when handling this material.

8.2.2.3 Skin protection
Hand Protection
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. 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. Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours.

Body protection
Use long sleeved antistatic garments and closed, antistatic safety shoes. 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.

8.2.2.4 Respiratory protection
Use a properly fitted, air-purifying or air-fed 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.

8.2.2 Environmental exposure control
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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
9.1 Information on basic physical and chemical properties
Appearance
- Physical state: Solid. [Metallic Powder.]
- Colour: Grey.
- Odour: Odourless.
- Odour threshold: Not available
- pH: Not available
- Melting point/freezing point: 1370 - 1455°C
Safety Data Sheet
LaserForm® Maraging Steel (A)
Revision Date: March 03rd, 2018

Initial boiling point and boiling range: Not available
Flash point: [Product does not sustain combustion.]
Flammability (solid, gas): Non-flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and shocks and mechanical impacts.
Explosive properties: Not applicable

- 20 Liter Screening Test [ASTM E 1226]: Not explosive.
- Minimum Ignition Temperature of a Dust Cloud (MAIT) [ASTM E1491]: >1000°C
- Percent Combustible Material (PCM) [OSHA NEP Test #3]: The sample oxidized. No values could be determined.

Flammability - Burning rate test [UN - Transport of dangerous goods Test - N.1]: No ignition

Upper/lower flammability or explosive limits: Not available.
Auto-ignition temperature: Not applicable.
Oxidising properties: Not expected based on chemical composition.

Decomposition temperature: Not available.
Viscosity: Not available.
Evaporation rate: Not available.
Vapour pressure: Not available.
Vapour density: Not available.
Relative density: Not available.
Solubility(ies): Not available.
Solubility in water (g/l): Not available.
Partition coefficient: n-octanol/water: Not available.

9.2 Other information
No additional information.

SECTION 10. STABILITY AND REACTIVITY

10.1 Chemical Stability
Stable under normal conditions and under recommended storage conditions.

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

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

10.4 Conditions to avoid
Store and use away from heat, sparks, open flame or any other ignition source.

10.5 Incompatible materials
Avoid contact with combustible materials, acids, oxidising agents, halogenated hydrocarbons.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity
Conclusion/Summary: Not available

Irritation/Corrosion
Conclusion/Summary: Not available

Sensitisation
Conclusion/Summary: Not available

Mutagenicity
Conclusion/Summary: Not available

Carcinogenicity

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

Reproductive toxicity
Conclusion/Summary: Not available
Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Conclusion/Summary : Not available

Specific target organ toxicity (repeated exposure)

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target Organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>Category 1</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

Aspiration hazard

Conclusion/Summary : Not available

11.2 Information on the likely routes of exposure

Routes of entry anticipated: oral, dermal, inhalation

11.3 Symptoms related to the physical, chemical and toxicological characteristics

Adverse symptoms may include the following

Eye contact : pain or irritation
  watering
  redness

Inhalation : respiratory tract irritation
  coughing
  wheezing and breathing difficulties
  asthma
  reduced foetal weight
  increase in foetal deaths
  skeletal malformations

Skin contact : irritation
  redness
  reduced foetal weight
  increase in foetal deaths
  skeletal malformations

Ingestion : reduced foetal weight
  increase in foetal deaths
  skeletal malformations

11.4 Delayed and immediate after short- and long-term exposure

11.4.1 Short term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

11.4.2 Long term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

11.5 Potential acute and chronic health effects

11.5.1 Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : May cause an allergic skin reaction

Ingestion : No known significant effects or critical hazards.

11.5.2 Potential chronic health effects

<table>
<thead>
<tr>
<th>Conclusion/Summary</th>
<th>General</th>
<th>Carcinogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Causes damage to organs through prolonged or repeated exposure. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.</td>
<td></td>
</tr>
</tbody>
</table>
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

SECTION 12. Ecological information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>cobalt</td>
<td>Acute LC50 4400 µg/l</td>
<td>Daphnia – Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 3.4 mg/l Fresh water</td>
<td>Fish – Pimephales promelas</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability
Conclusion/Summary: Not available

12.3 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>
</tbody>
</table>

12.4 Mobility in soil
Soil/water partition coefficient (Koc): Not available
Mobility: Not available

12.5 Results of PBT and vPvB assessment
PBT: Not applicable
vPvB: Not applicable

12.6 Other adverse effects
No known significant effects or critical hazards

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

13.1.1 Product
Methods of disposal
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.

Hazardous waste
The classification of the product may meet the criteria for a hazardous waste.

13.1.2 Packaging
Methods of disposal
Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

13.2 Special precautions
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 spilt material and runoff and contact with soil, waterways, drains and sewers.
## SECTION 14. Transport information

<table>
<thead>
<tr>
<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>UN number</td>
<td>UN3077</td>
<td>UN3077</td>
<td>UN3077</td>
<td>UN3077</td>
<td>UN3077</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>Environmentally hazardous substance, solid, n.o.s. (cobalt, Nickel)</td>
<td>Environmentally hazardous substance, solid, n.o.s. (cobalt)</td>
<td>Environmentally hazardous substance, solid, n.o.s. (cobalt)</td>
<td>Environmentally hazardous substance, solid, n.o.s. (cobalt)</td>
<td>Environmentally hazardous substance, solid, n.o.s. (cobalt)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

### Additional information

**DOT Classification**

**Reportable quantity** 10 lbs / 4.54 kg. The classification of the product is due solely to the presence of one or more US DOT-listed ‘Hazardous substances’ that are subject to reportable quantity requirements and only applies to shipments of packages greater than, or equal to, the product reportable quantity. Package sizes less than the product reportable quantity are not regulated as hazardous materials.

**Remarks** Subject to 49 CFR Chapter 171.4 (c ) (2)

**TDG Classification**

Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark). Non-bulk packages of this product are not regulated as dangerous goods when transported by road or rail.

**Remarks** Subject to TDG Special Provision 99 (2)

**Mexico Classification**

The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg.

**ADR/RID**

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

**Remarks** Subject to ADR Special Provision A375

**IMDG**

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

**Remarks** Subject to IMDG Code 37-14 Chapter 2.10.2.7

**IATA**

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

**Remarks** Subject to IATA Special Provision A 197

**Special precautions for user**

**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 and the IBC Code**

Not available.
SECTION 15: Regulatory information

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

U.S. Federal regulations
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
Clean Water Act (CWA) 307: Nickel

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

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

SARA
302/304
Composition/information on ingredients: No products were found
304 RQ: Not applicable.

311/312
Classification: Immediate (acute) health hazard
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>
</table>

313
Product name | CAS number | %
Nickel    | 7440-02-0  | ≥10 - ≤25
Cobalt   | 7440-48-4  | ≥10 - ≤25

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; COBAL; MOLYBDENUM
New York : The following components are listed: Nickel
New Jersey : The following components are listed: NICKEL; COBAL; MOLYBDENUM; TITANIUM
Pennsylvania : The following components are listed: NICKEL; COBAL FUME; MOLYBDENUM
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>-</td>
<td>-</td>
</tr>
<tr>
<td>Cobalt metal powder</td>
<td>Yes.</td>
<td>No.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

INTERNATIONAL REGULATIONS
UNECE Aarhus Protocol on POPs and Heavy Metals: Not listed.

INVENTORY LIST
United States: All components are listed or exempted.
15.2 Chemical Safety Assessment
This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16. OTHER INFORMATION

National Fire Protection Association (U.S.A.)

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Abbreviations and acronyms
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

Procedure used to derive the classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Irritation - Category 2A - H319</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Respiratory Sensitization - Category 1 - H334</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Skin Sensitization - Category 1 - H317</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Carcinogenicity - Category 2 - H351</td>
<td>Expert judgment</td>
</tr>
<tr>
<td>Toxic to reproduction (fertility) - Category 2 - H361f</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Specific Target Organ Toxicity (Repeated Exposure) - Category 1 - H372</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Hazard (acute) - Category 1 - H400</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Hazard (long-term) - Category 2 - H411</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

Full text of abbreviated H statements

H317 : May cause an allergic skin reaction.
H319 : Causes serious eye irritation.
H332 : Harmful if inhaled.
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H350i : May cause cancer if inhaled.
H351 : Suspected of causing cancer.
H361f : Suspected of damaging fertility.
H372 : Causes damage to organs through prolonged or repeated exposure.
H400 : Very toxic to aquatic life.
H410 : Very toxic to aquatic life with long lasting effects.
H411 : Toxic to aquatic life with long lasting effects.
H412 : Harmful to aquatic life with long lasting effects.

SDS information
Creation date : October 12th, 2017
Revision : 00-B
Revision date : March 03th, 2018
Revision changes : Addition of H sentence (H400) and explosion/flammability test results.
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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.

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