1 Identification

Product identifier
Trade name: AMASTEEL
Application of the substance / the mixture: Cast steel

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Ervin Industries, Inc.
3893 Research Park Drive
Ann Arbor, MI 48108-2217
Phone: (734)-769-4600/Fax: (734)-663-0136
sales@ervinindustries.com
http://www.ervinindustries.com/

Information department:
Quality Assurance Department
(mo-thu: 8a.m.-4p.m., fr 8a.m.-1p.m.)

Emergency telephone number: Tel.: +(734)-769-4600/Fax: (734)-663-0136

2 Hazard(s) Identification

Classification of the substance or mixture
The product is not classified according to the Globally Harmonized System (GHS).

Additional information: Reference test method for release of nickel available - see section 11

Label elements
GHS label elements: Void
Hazard pictograms: Void
Signal word: Void
Hazard statements: Void

Classification system:
NFPA ratings (scale 0 - 4)

Health = 0
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = 0
Fire = 0
Reactivity = 0

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures
Description: Mixture: consisting of the following components.

<table>
<thead>
<tr>
<th>Dangerous components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-44-0 carbon</td>
<td>0.8-1.2%</td>
</tr>
<tr>
<td>7439-96-5 manganese</td>
<td>0.35-1.2%</td>
</tr>
<tr>
<td>7440-21-3 silicon</td>
<td>0.4-1.5%</td>
</tr>
<tr>
<td>7704-34-9 sulfur</td>
<td>&lt;0.05%</td>
</tr>
<tr>
<td>7723-14-0 phosphorus</td>
<td>&lt;0.05%</td>
</tr>
<tr>
<td>7440-02-0 nickel</td>
<td>&lt;0.2%</td>
</tr>
</tbody>
</table>

(Contd. on page 2)
4 First-aid measures

Description of first aid measures
General information: No special measures required.
After inhalation: Supply fresh air; consult doctor in case of complaints.
After skin contact:
Rinse with warm water.
If skin irritation continues, consult a doctor.
After eye contact: Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
After swallowing:
Rinse out mouth and then drink plenty of water.
If symptoms persist consult doctor.
Information for doctor:
Most important symptoms and effects, both acute and delayed No further relevant information available.
Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents: CO2, sand, extinguishing powder. Do not use water.
For safety reasons unsuitable extinguishing agents: Water
Special hazards arising from the substance or mixture
products are non-flammable.
Fine metal dust that is created as a waste stream and/or contaminants that are removed during the blasting process may pose a small risk of fire or explosion.
Advice for firefighters
Protective equipment: No special measures required.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Scrap and remnants can create slip-and-fall hazards. It is recommended to keep floors and work areas clean at all times.
Environmental precautions: No special measures required.
Methods and material for containment and cleaning up: Pick up mechanically.
Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
Protective Action Criteria for Chemicals

<table>
<thead>
<tr>
<th>PAC-1:</th>
<th>6 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-44-0</td>
<td>carbon</td>
</tr>
<tr>
<td>7440-21-3</td>
<td>silicon</td>
</tr>
<tr>
<td>7723-14-0</td>
<td>phosphorus</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>nickel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PAC-2:</th>
<th>330 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-44-0</td>
<td>carbon</td>
</tr>
<tr>
<td>7440-21-3</td>
<td>silicon</td>
</tr>
<tr>
<td>7723-14-0</td>
<td>phosphorus</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>nickel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PAC-3:</th>
<th>2,000 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-44-0</td>
<td>carbon</td>
</tr>
</tbody>
</table>
7 Handling and storage

Handling:
- Precautions for safe handling
  Special care must be exercised to prevent product leakage. Exercise extra caution when removing the tension straps that are part of wholesale pallet deliveries.
- Information about protection against explosions and fires: No special measures required.

Conditions for safe storage, including any incompatibilities
- Storage:
  - Requirements to be met by storerooms and receptacles: No special requirements.
  - Information about storage in one common storage facility: Not required.
- Further information about storage conditions: None.
- Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems: No further data; see item 7.

Control parameters
- Components with limit values that require monitoring at the workplace:
  The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>PEL Ceiling limit value</th>
<th>REL Short-term value</th>
<th>TLV Long-term value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-96-5 manganese</td>
<td>5 mg/m³ as Mn</td>
<td>3 mg/m³</td>
<td>0.02* 0.1** mg/m³ as Mn</td>
</tr>
<tr>
<td>7440-21-3 silicon</td>
<td>15* 5** mg/m³ *total dust **respirable fraction</td>
<td>10* 5** mg/m³ *total dust **respirable fraction</td>
<td>TLV withdrawn</td>
</tr>
</tbody>
</table>

Additional information: The lists that were valid during the creation were used as basis.

Exposure controls
- Personal protective equipment:
  - General protective and hygienic measures:
    The usual precautionary measures for handling chemicals should be followed.
  - Breathing equipment:
    Use suitable respiratory protective device in case of insufficient ventilation.
    Filter P2
  - Protection of hands:
    Leather gloves
- Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
Material of gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material
The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

The determined penetration times according to EN 374 part III are not performed under practical conditions. Therefore a maximum wearing time, which corresponds to 50% of the penetration time, is recommended.

Eye protection: Safety glasses
Body protection: Protective work clothing

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:
Form: Solid
Odor: Odorless
Odor threshold: Not determined.

pH-value: Not applicable.

Change in condition
Melting point/Melting range: 1500 °C (2732 °F) (~2700 °F)
Boiling point/Boiling range: 3000 °C (5432 °F) (~5400 °F)
Flash point: Not applicable.
Flammability (solid, gaseous): Not determined.

Ignition temperature: Not determined.
Auto igniting: Product is not selfigniting.
Danger of explosion: Product does not present an explosion hazard.

Explosion limits:
Lower: Not determined.
Upper: Not determined.

Vapor pressure: Not applicable.
Density at 20 °C (68 °F): 7.8 g/cm³ (65.091 lbs/gal)
Relative density: Not determined.
Vapor density: Not applicable.
Evaporation rate: Not applicable.

Solubility in / Miscibility with Water: Insoluble.
Very little danger of rust forming.

Partition coefficient (n-octanol/water): Not determined.

Viscosity:
Dynamic: Not applicable.
Kinematic: Not applicable.

Solvent content:
Organic solvents: 0.0 %
VOC content: 0.0 g/l / 0.00 lb/gl
Other information: No further relevant information available.

10 Stability and reactivity

Reactivity: No further relevant information available.
45.1.2 Chemical stability

Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
Possibility of hazardous reactions: No dangerous reactions known.
Conditions to avoid: No further relevant information available.
Incompatible materials: No further relevant information available.
Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

Information on toxicological effects

Acute toxicity:
  Primary irritant effect:
    on the skin: No irritant effect.
    on the eye: No irritating effect.

Sensitization:
  Examination nickel release in accordance with DIN EN 1811: 2012-10: done
  Sample Number 2016-00916
  <0.1 μg per cm² and week
  therefore no sensitization detected.

Additional toxicological information:
The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specifications, the product does not have any harmful effects according to our
experience and the information provided to us.

Carcinogenic categories

| IARC (International Agency for Research on Cancer) |  |
| 7440-02-0 | nickel | 1 |
|  |

| NTP (National Toxicology Program) |  |
| 7440-02-0 | nickel | R |
|  |

| OSHA-Ca (Occupational Safety & Health Administration) |  |
| None of the ingredients is listed. |  |

12 Ecological information

Toxicity
  Aquatic toxicity: No further relevant information available.
  Persistence and degradability: No further relevant information available.

Behavior in environmental systems:
  Bioaccumulative potential: No further relevant information available.
  Mobility in soil: No further relevant information available.

Additional ecological information:
  General notes: Generally not hazardous for water
  Results of PBT and vPvB assessment
    PBT: Not applicable.
    vPvB: Not applicable.
  Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods
  Recommendation:
    completely emptied packaging in 25kg paper bag: paper recycling
    completely emptied packaging in big bags: commercial waste disposal
    completely emptied packaging in steel barrels: metal recycling
45.1.2 Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

| UN-Number | DOT, ADR, ADN, IMDG, IATA | Void |
| UN proper shipping name | DOT, ADR, ADN, IMDG, IATA | Void |
| Transport hazard class(es) | DOT, ADR, ADN, IMDG, IATA | Void |
| Class | Void |
| Packing group | DOT, ADR, IMDG, IATA | Void |
| Environmental hazards: | Marine pollutant: | No |
| Special precautions for user | Not applicable. |
| Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code | Not applicable. |
| UN "Model Regulation": | Void |

15 Regulatory information

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

Sara
Section 355 (extremely hazardous substances):
7723-14-0 phosphorus

Section 313 (Specific toxic chemical listings):
7439-96-5 manganese
7723-14-0 phosphorus
7440-02-0 nickel

TSCA (Toxic Substances Control Act):
7440-44-0 carbon
7440-21-3 silicon
7704-34-9 sulfur
7723-14-0 phosphorus

Proposition 65
Warning: This product can expose you to chemicals including Nickel, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Chemicals known to cause cancer:
7440-02-0 nickel

Chemicals known to cause reproductive toxicity for females:
None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for males:
None of the ingredients is listed.
Safety Data Sheet
acc. to OSHA HCS

Trade name: AMASTEEL

Chemicals known to cause developmental toxicity:
None of the ingredients is listed.

Cancerogenity categories

<table>
<thead>
<tr>
<th>EPA (Environmental Protection Agency)</th>
<th>TLV (Threshold Limit Value established by ACGIH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-96-5 manganese</td>
<td>7440-02-0 nickel</td>
</tr>
<tr>
<td>7723-14-0 phosphorus</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>A5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NIOSH-Ca (National Institute for Occupational Safety and Health)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-02-0 nickel</td>
</tr>
</tbody>
</table>

GHS label elements: Void
Hazard pictograms: Void
Signal word: Void
Hazard statements: Void

National regulations:

Information about limitation of use: Employment restrictions concerning young persons must be observed.
Water hazard class: Generally not hazardous for water.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Contact: Dr. W. Assmann

Date of preparation / last revision 08/28/2018 / 6

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit

* Data compared to the previous version altered. AMASTEEL