COLUMBIA STEEL CASTING CO., INC.


SAFETY DATA SHEET (SDS):
HIGH ALLOYED STEEL CASTINGS

DATE ISSUED:
January 2017

SECTION 1 – PRODUCT IDENTIFICATION & COMPANY INFORMATION

PRODUCT NAME:
HIGH ALLOYED STEEL CASTINGS

OTHER DESIGNATIONS:

ASTM Numbers: N/A
ACI ALLOY DESIGNATIONS (GRADES): N/A

PRODUCT IDENTIFICATION (LABEL IDENTIFIER):
CARBON AND LOW ALLOY STEEL CASTINGS – ALLOY DESIGNATION “S”

MANUFACTURER’S NAME:
Columbia Steel Casting Co., Inc.

STREET ADDRESS:
10425 N. Bloss Avenue

EMERGENCY TELEPHONE NO.:
503-286-0685

MAILING ADDRESS:
PO Box 83095

TELEPHONE NO.:
503-286-0685

CITY, STATE, ZIP, COUNTRY:
Portland, Oregon, 97283-0095, USA

FAX NO.:
503-286-1743

EMAIL / WEBSITE:
service@columbiasteel.com / columbiasteel.com

RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE:
Solid casting; no restrictions

SECTION 2 – HAZARD IDENTIFICATION

CLASSIFICATION
Castings are metallic articles that do not present hazards in their original form.

OTHER INFORMATION
1. Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing crystalline silica.
2. Fumes from hot processes may contain other compounds with different exposure limits. Dust or fumes generated by machining, grinding, welding or thermal cutting of the casting may produce airborne contaminants. Consult Sections 3 & 8 for further information.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CHEMICAL NAME / COMMON NAMES / SYNONYM</th>
<th>WT %</th>
<th>CAS NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium (Cr)</td>
<td>10-30</td>
<td>7440-47-3</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>Remainder</td>
<td>7439-89-6</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>10-30</td>
<td>7440-02-0</td>
</tr>
</tbody>
</table>

SECTION 4 – FIRST AID MEASURES

EYE CONTACT: Not applicable
SKIN CONTACT: No special requirements
INGESTION: Not applicable
INHALATION: Not applicable

SECTION 5 – FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES: Not applicable
EXTINGUISHING MEDIA: Not applicable
PROTECTION OF FIREFIGHTERS: Not applicable

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Not applicable
SECTION 7 – HANDLING & STORAGE

RECOMMENDED STORAGE: No special requirements

PROCEDURES FOR HANDLING: Proper hand and foot protection is recommended

SECTION 8 – EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING CONTROLS
None required. There are no health hazards from castings in solid form.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA PEL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium (Cr)</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>N/E</td>
<td>N/E</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>1.5(I)</td>
<td>1</td>
</tr>
</tbody>
</table>

SUPPLEMENTAL INFORMATION
Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing crystalline silica.
Fumes from hot processes may contain other compounds with different exposure limits than those listed above. Dust or fumes generated by machining, grinding, welding or thermal cutting of the casting may produce airborne contaminants. Exposure limits for the most common contaminants are offered as reference. Please consult a competent person for guidance on exposure assessment and controls.

In particular, Hexavalent Chromium is an OSHA Expanded Health Standard; refer to OSHA 29 CFR 1910.1026-Chromium (VI) for complete requirements.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA PEL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium Compounds (as Cr):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium (II) inorganic compounds</td>
<td>N/E</td>
<td>0.5</td>
</tr>
<tr>
<td>Chromium (III) inorganic compounds</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Chromium (VI) inorganic compounds, certain water insoluble</td>
<td>0.01</td>
<td>0.005</td>
</tr>
<tr>
<td>Chromium (VI) inorganic compounds, water soluble</td>
<td>0.05</td>
<td>0.005</td>
</tr>
<tr>
<td>Chromium (VI) all forms and compounds</td>
<td>N/E</td>
<td>0.005</td>
</tr>
<tr>
<td>Iron Compounds:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron oxide (Fe₂O₃) fume</td>
<td>N/E</td>
<td>10</td>
</tr>
<tr>
<td>Iron oxide (Fe₂O₃)</td>
<td>5 (R)</td>
<td>N/E</td>
</tr>
</tbody>
</table>

TERMS
All exposure limits referenced above are 8 hour time weighted averages (TWA) unless otherwise noted.
N/E = None Established
C = Ceiling
I = Inhalable fraction
R= Respirable fraction
TLV = Threshold Limit Value/ACGIH (American Conference of Industrial Hygienists)
PEL = Permissible Exposure Limit/OSHA (Occupational Safety & Health Administration)
STEL= Short Term Exposure Limit
mg/m³ = milligrams per cubic meter

PERSONAL PROTECTION
Proper hand and foot protection is recommended.

SECTION 9 – PHYSICAL & CHEMICAL PROPERTIES

APPEARANCE / PHYSICAL STATE
Solid, silver gray in color

ODOR / ODOR THRESHOLD
None

MELTING POINT / FREEZING POINT
2950 °F (1620 °C)

SPECIFIC GRAVITY (Relative Density)
0.28 lb/in³ (7.74 g/cm³) for cast alloy steels

BOILING POINT

VAPOR DENSITY
Not applicable

VAPOR PRESSURE

HIGH ALLOYED STEEL CASTINGS
Reviewed June 19, 2017
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000°F (2750 °C) for iron</td>
<td>Not applicable</td>
</tr>
<tr>
<td>FLASH POINT</td>
<td>EVAPORATION RATE</td>
</tr>
<tr>
<td>Not applicable for solid castings</td>
<td>Not applicable</td>
</tr>
<tr>
<td>FLAMMABILITY</td>
<td>SOLUBILITY IN WATER</td>
</tr>
<tr>
<td>Not flammable</td>
<td>Insoluble</td>
</tr>
<tr>
<td>UPPER &amp; LOWER FLAMMABILITY LIMITS</td>
<td>pH</td>
</tr>
<tr>
<td>Not applicable for solid castings</td>
<td>Not applicable</td>
</tr>
<tr>
<td>AUTO IGNITION TEMPERATURE</td>
<td>VISCOSITY</td>
</tr>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>DECOMPOSITION TEMPERATURE</td>
<td>PARTITION COEFFICIENT</td>
</tr>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**SECTION 10 – STABILITY & REACTIVITY**

**CHEMICAL STABILITY**
- Stable

**CONDITIONS TO AVOID**
- None

**REACTIVITY**
- Not reactive

**INCOMPATIBLE MATERIALS**
- None

**HAZARDOUS DECOMPOSITION PRODUCTS**
- None

**POSSIBILITY OF HAZARDOUS REACTIONS**
- Not applicable

**SECTION 11 – TOXICOLOGICAL INFORMATION**

**POTENTIAL HEALTH EFFECTS**
- EYE CONTACT: None
- SKIN: None
- INGESTION: None
- INHALATION: None

**CARCINOGEN CLASSIFICATION OF INGREDIENTS**

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>OSHA</th>
<th>NTP</th>
<th>IARC</th>
<th>TARGET ORGAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>Y</td>
<td>NL</td>
<td>3</td>
<td>Lung</td>
</tr>
<tr>
<td>Nickel (metal)</td>
<td>NL</td>
<td>K</td>
<td>2B</td>
<td>Lung, Nose</td>
</tr>
</tbody>
</table>

**TERMS**
- OSHA—Occupational Safety & Health Administration
  - Y = Listed as a Human Carcinogen
- NTP—National Toxicology Program
  - K = Known to be a Human Carcinogen
  - R = Reasonably Anticipated to be a Human Carcinogen (RAHC)
- IARC—International Agency for Research on Cancer
  - 1 = Carcinogen to Humans
  - 2A = Probably Carcinogenic to Humans
  - 2B = Possibly Carcinogenic to Humans
  - 3 = Unclassifiable as to Carcinogenicity in Humans
  - 4 = Probably not Carcinogenic to Humans
  - Other
  - NL = Not Listed

**SECTION 12– ECOLOGICAL INFORMATION**

**ECOTOXICITY**
- Not applicable

**PERSISTENCE AND DEGRADABILITY**
- Not applicable

**BIOACCUMULATION POTENTIAL**
- Not applicable

**MOBILITY IN SOLID**
- Not applicable

**OTHER ADVERSE EFFECTS**
- Not applicable
SECTION 13 – DISPOSAL CONSIDERATIONS

Recover or recycle if possible. Dispose of according to federal, state and local regulations. Dust collected from machining, welding, etc. may be classified as a hazardous waste. Consult federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>US DEPARTMENT OF TRANSPORTATION (DOT)-HMR (Hazardous Materials Registrations)</th>
<th>CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN SHIPPING NAME</th>
<th>UN NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANSPORT HAZARD CLASS</th>
<th>PACKING GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENVIRONMENTAL HAZARDS</th>
<th>LABEL(S) REQUIRED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANSPORT IN BULK</th>
<th>SPECIAL SHIPPING INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

SECTION 15 – REGULATORY INFORMATION

**US-OSHA (Hazard Communication Standard)**
Reference 29 CFR 1910.1200 and 1910.1000. A finished casting is an article as defined in the OSHA Hazard Communication Standard 29CFR 1910.1200 (c). Dust or fumes generated by cleaning, machining, grinding, or welding of the casting may produce airborne contaminants, such as chromium, iron, nickel, and silica. For hexavalent chromium references see 29 CFR 1910.1026.

**US-EPA (Toxic Substances Control Act–TSCA)**
All components of these products are on the TSCA inventory list or are excluded from listing.

**US-EPA (SARA Title III)**
Releases to the environment of Chromium, Manganese, Molybdenum, and Nickel, may be subject to reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

**CANADA-WHMIS (Workplace Hazardous Materials Information System)**
This SDS has been prepared according to the hazard criteria of the Controlled Product Regulations (CPR) and the SDS contains the information required by the CPR.

**CANADA DSL (Domestic Substance List) Inventory Status**
All components of these products are on the DSL Inventory.

**CEPA (Canadian Environmental Protection Act)**
Chromium and nickel are on the CEPA Priority Substances List.

**EINECS No. (European Inventory of Existing Commercial Chemical Substances)**
All components of these products are on the EINECS list.

**RoHS (Restriction of Certain Hazardous Substances) Compliance**
Castings comply with RoHS

**CALIFORNIA PROPOSITION 65 Compliance**
WARNING: This product contains or produces chemicals known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code 25248.5 et seq.)

**US STATE REGULATORY INFORMATION**
Some of the components listed in Section 3 may be covered under specific state regulations.

SECTION 16 – OTHER INFORMATION

<table>
<thead>
<tr>
<th>SDS SHEET PREPARED BY:</th>
<th>DATE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia Steel Casting Co., Inc.</td>
<td>January 2017</td>
</tr>
</tbody>
</table>

NOTE
This data and label information is offered in good faith as typical values and not as a product specification. No warranty either expressed or implied is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review the recommendations in specific context of the intended use and determine if they are appropriate.
ADDENDUM: LABEL INFORMATION

<table>
<thead>
<tr>
<th>PRODUCT IDENTIFIER</th>
<th>HIGH ALLOYED STEEL CASTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPLIER IDENTIFICATION</td>
<td></td>
</tr>
<tr>
<td>COMPANY NAME:</td>
<td>Columbia Steel Casting Co., Inc.</td>
</tr>
<tr>
<td>STREET ADDRESS:</td>
<td>10425 N. Bloss Avenue</td>
</tr>
<tr>
<td>MAILING ADDRESS:</td>
<td>PO Box 83095</td>
</tr>
<tr>
<td>CITY, STATE, ZIP, COUNTRY:</td>
<td>Portland, Oregon, 97283-0095, USA</td>
</tr>
<tr>
<td>EMERGENCY TELEPHONE NO.:</td>
<td></td>
</tr>
<tr>
<td>HAZARD PICTOGRAMS</td>
<td>*None</td>
</tr>
<tr>
<td>SIGNAL WORD</td>
<td>*None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRECAUTIONARY STATEMENTS</th>
<th>HAZARD STATEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>None*</td>
<td>*None</td>
</tr>
</tbody>
</table>

*Castings do not present hazards in their original form.

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