MATERIAL SAFETY DATA SHEET

OSTALLOY 158

Date revised: 4/1/15  Date issued: 4/1/15

SECTION I - MATERIAL IDENTIFICATION

Producer:  
Umicore Indium Products

Emergency Telephone Number:  
Transport Emergencies: Chemtrec
Telephone: 800-424-9300

Chemical name and synonyms:  
Ostalloy 158
Trade names and synonyms: N/A

Hazard class (49CFR 172.101): None

SECTION II - HAZARDOUS INGREDIENTS/ IDENTITY INFORMATION

<table>
<thead>
<tr>
<th>Hazardous Components</th>
<th>CAS #</th>
<th>Weight %</th>
<th>OSHA: PEL-TWA</th>
<th>ACGIH: TLV-TWA</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>7440-43-9</td>
<td>10.0</td>
<td>0.005 mg/m³</td>
<td>0.005 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Tin</td>
<td>7440-31-5</td>
<td>13.3</td>
<td>2 mg/m³</td>
<td>2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>26.7</td>
<td>0.05 mg/m³</td>
<td>0.05 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Bismuth</td>
<td>7440-69-9</td>
<td>50.0</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

SECTION III - PHYSICAL / CHEMICAL CHARACTERISTICS

Boiling Point: > 100 C  
Specific gravity (water=1): 9.67

Vapor Pressure (mm Hg.): <100  
Melting Point: 70 C

Vapor Density (Air = 1): N/A  
Evaporation Rate (butyl acetate = 1): Unknown

Appearance and Odor: Solid, Metallic metal  
Solubility in Water: Minimal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method used): N/A  
Flammable Limits: LEL: N/A.... UEL: N/A.

Extinguishing Media:  
a) Dry Powder  
b) Carbon Dioxide

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards: Unknown
SECTION V - REACTIVITY DATA

Stability: Stable:  Conditions to avoid: Mixing with Corrosive Liquids
Incompatibility (Material to avoid): Corrosives
Hazardous Decomposition or Byproducts: None
Hazardous Polymerization: Will not occur:  Conditions to avoid: None

SECTION VI - HEALTH HAZARD DATA

Possible routes of entry:  Inhalation:  Ingestion:  Skin:

Acute Hazards:
Inhalation: Inhalation of cadmium dust may cause dryness of the throat, cough, headache, shortness of breath.
Ingestion: None
Skin contact: Molten metal will cause thermal burns of the skin.
Eyes Contact: Molten metal will burn.

Chronic Effects:
Carcinogenicity: Cadmium is a recognized carcinogen by IARC and OSHA. Lead is a known carcinogen according to IARC.
Inhalation: Overexposure to cadmium fumes and/or dust causes shortness of breath, a sense of constriction of the chest. Cadmium is listed on the Rhode Island list of designated substances.
Long term overexposure to lead causes constipation, gastrointestinal disorders, anemia, weakness, and joint pain. Overexposure may have effects on the reproductive system.
Overexposure to tin fumes result in stannosis, a benign pneumoconiosis.
Ingestion: Chronic intoxication of bismuth compounds from repeated oral doses causes “bismuth line”.
This is a gum condition with black spots of buccal or colonic mucosa, superficial stomatitis, foul breath, and salivation.
Skin contact: Injection of bismuth will cause bismuth line.
Eye contact: None.

Irritation / Sensitization: Has not been fully tested

Medical Conditions which may be aggravated by exposure: Respiratory and reproductive issues.

Emergency and First Aid Procedures:
Inhalation: Get to fresh air. If not breathing, use artificial respiration. Seek medical attention.
Ingestion: Contact nearest poison control center for information.
Skin contact: Wash skin thoroughly with soap and water. Seek medical attention.
Eye contact: Wash eyes for at least 15 minutes. Seek medical attention.
**SECTION VII – PRECAUTIONS FOR SAFE HANDLING AND USE**

Steps to be taken in case material is released or spilled: Allow molten alloy to solidify and then scrap up.

Waste disposal method: Follow all Federal, State, and local regulations regarding disposal.

Precautions to be taken in handling and storing: Keep containers closed. Handle in ventilated area. Wear proper personal protective equipment.

Other precautions: None

**SECTION VIII – CONTROL MEASURES**

Respiratory protection (specific type): Full face Cartridge with HEPA cartridges if exposures are above OSHA or ACGIH limits.

Ventilation: Local exhaust ventilation is recommended. Use in a well ventilated area.

Protective gloves: Latex gloves or nitrile gloves are recommended under thermal protection when handling molten materials. Nitrile or latex gloves should be worn whenever handling the material.

Eye protection: Safety Glasses with side shields and a face shield are recommended when handling molten materials

Other protective clothing or equipment: None

Work / Hygienic Practices: Keep the work area clean and neat. Do not eat, drink, or apply cosmetics in the work area. Do not use near food or drink. Avoid making dust. Wash hands before eating or drinking after handling the material.
SECTION IX - ADDITIONAL INFORMATION

HAZARDOUS MATERIAL DESCRIPTION & PROPER SHIPPING NAME (49CFR172.101):
None

REGULATORY INFORMATION:

a) CERCLA Hazardous Substance: ☑ Yes ☐ No
b) SARA, title III, Extremely Hazardous Substance
   Reportable Quantity: not applicable
   Threshold planning quantity: not applicable
   ☐ Yes ☑ No
c) Toxic Chemical Release Report
d) NFPA Hazard Ratings: Health: 3 Fire: 0 Reactivity: 1
   (*) Indicates that no final reportable quantity is being assigned to the generic broad class.

REFERENCES:

PERMISSIBLE CONCENTRATION REFERENCES:
- OSHA (U.S. Occupational Safety & Health Standards 29 CFR Part 1910-42399)
- ACGIH: TLV-TWA: American Conference of Governmental Industrial Hygienists (Threshold Limit Value – Time Weighted Average), edition 2001

HAZARD INFORMATION REFERENCES:
- International Agency for Research on Cancer (IARC) - Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans – supplement 4
- RTECS: Registry of Toxic Effects of Chemical Substances; NIOSH, edition November 2001
- NIOSH: U.S. National Institute for Occupational Safety and Health

GENERAL
- SARA (Superfund Amendments and Reauthorization Act of 1986): Extremely Hazardous Substances List
- 40 CFR Part 355 (not applicable)

Prepared by: Eric M. Stager, IHIT, OHST

Individuals exposed to Ostalloy 158 should be informed of all relevant hazards and recommended safety precautions and should have access to the information contained in this MSDS. Therefore, this Material Safety Data Sheet should be made available by the buyer to each of buyer's plant workers.

The buyer assumes all risk in connection with the use and handling of the material. The seller assumes no responsibility or liability in connection with the information supplied in this sheet or for any damage or injury or damage caused by the material; reasonable safety procedures should be followed. The seller assumes no responsibility for injury or damage caused by use of the material even if reasonable safety procedures are followed. The information contained in this sheet is developed from what is believed to be accurate and reliable sources but the seller makes no warranties, either expressed or implied, and assumes no responsibility for the accuracy or completeness of the data contained herein.