Material Safety Data Sheet

Product No. 29-27, 9570 Cobalt Products
Issue Date (11-22-06)
Review Date (05-03-12)

Section 1: Product and Company Identification
Product Name: Cobalt Products
Synonym:
Company Name
Ted Pella, Inc., P.O. Box 492477, Redding, CA 96049-2477
Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
Chemetrec Emergency Number 1-800-424-9300 24 hrs a day.

Section 2: Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)</th>
<th>%</th>
<th>OSHA PEL mg/m3</th>
<th>ACGIH TLV mg/m3</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (7440-48-4)</td>
<td>99.8</td>
<td>0.05</td>
<td>0.1</td>
<td>ND</td>
<td>2B</td>
<td>Yes</td>
</tr>
</tbody>
</table>

NIOSH Immediately Dangerous To Life or Health Concentration (IDLH): 20 mg/m3 (as dust or flume).

Section 3: Hazard Identification

Emergency overview
Appearance: Metallic grey, pieces, wire, disc or powder.
Immediate effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential health effects
Primary Routes of entry: Eye contact. Inhalation. Ingestion.
Signs and Symptoms of Overexposure: Prolonged inhalation of cobalt dust, fumes or mist may cause serious respiratory illness. There are references in literature associating cobalt with interstitial fibrosis, a disease that can be fatal.
Eyes: May cause irritation.
Skin: May cause irritation. Single prolonged contact is essentially non-irritating.
Repeated exposure may cause allergic dermatitis, usually occurring in the skin areas of friction. May cause cross sensitivity to Chromium and Nickel.
Ingestion: Amounts of ingested incidental to industrial handling are not likely to cause injury. Single dose oral toxicity is low. Ingestion of significant amounts of cobalt has been reported to have potential for causing blood, heart, thyroid and pancreatic damage.
Inhalation: Inhalation may cause an irritation of the respiratory organs of sensitive persons resulting in obstruction of airways.
Chronic Exposure: Prolonged inhalation of cobalt dust, fumes or mist may cause serious respiratory illness.
Chemical Listed As Carcinogen Or Potential Carcinogen: Classified A3 (Proven for animal.) by ACGIH. Cobalt is an OSHA Select carcinogen. NTP Report on Carcinogens lists only cobalt sulfate as "Reasonably anticipated to be a human carcinogen".

See Toxicological Information (Section11)

**Potential environmental effects**
See Ecological Information (Section 12)

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**Section 4: First Aid Measures**

*If accidental overexposure is suspected*

**Eye(s) Contact:** Flush eyes with lukewarm water lifting up the upper and lower lids for at least fifteen minutes. If irritation persists, seek medical attention.

**Skin Contact:** Remove contaminated clothing. Wash affected area with soap or mild detergent and large amounts of water.

**Inhalation:** Remove from exposed area to fresh air immediately; keep warm and quiet, give oxygen if breathing is difficult. Seek medical attention.

**Ingestion:** Induce vomiting if large amounts are ingested.

**Note to physician**

**Treatment:** ND

**Medical Conditions generally Aggravated by Exposure:** ND

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**Section 5: Fire Fighting Measures**

**Flash Point:** ND

**flammable Limits:** ND

**Auto-ignition point:** ND

**Fire Extinguishing Media:** Small Fire: Use dry chemical powder. Large Fire: Use water spray or fog.

**Special Fire Fighting Procedures:** ND

**Unusual Fire and Explosion Hazards:** Extremely fine powder (3 microns or smaller) is combustible. Larger sized cobalt powder does not present a fire or explosion hazard. May generate toxic fumes.

**Hazardous combustion products:** Toxic metal oxide fume.

**DOT Class:** Powder form: flammable.

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**Section 6: Accidental Release Measures**

Steps to be Taken in Case Material is Released or Spilled: Use appropriate tools to put the spilled solid in a convenient waste disposal container. Powder form: Flammable solid. Do not touch spilled material. Be sure to use an approved/certified respirator or equivalent. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV.
Waste Disposal Methods: Dispose of waste according to Federal, State and Local Regulations.

**Section 7: Handling and Storage**
Precautions to be Taken in Handling and Storage: Keep material in closed containers. Do not store near mineral acids. Use good house-cleaning practices to prevent accumulation of dust and follow cleaning procedures (vacuuming & wet sweeping) that will keep airborne particulate at a minimum. Avoid breathing dust. Wash thoroughly after handling.
Storage temperature: Room Temperature.
Storage Pressure: NA

**Section 8: Exposure Controls / Personal Protection**
**Engineering Controls**
Ventilation required: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection Equipment**
Respiratory protection: Dust respirator. Be sure to use an approved/certified respirator or equivalent.
Protective gloves: Gloves.
Skin protection: Lab coat.
Eye protection: Splash goggles.
Additional clothing and/or equipment: Eye wash station or shower.

**Exposure Guidelines**
See Composition/Information on Ingredients (Section 2)

**Section 9 Physical and Chemical Properties**
Appearance and Physical State: Metallic grey powder, pieces, wire, disc. Solid.
Odor (threshold): NA
Specific Gravity (H2O=1): 8.92 g/cc
Vapor Pressure (mm Hg): ND
Vapor Density (air=1): ND
Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): ND
Boiling Point: 3100°C (5612°F)
Freezing point / melting point: 1493°C (2719.4°F)
pH: NA
Solubility in Water: Insoluble in cold water
Molecular Weight: 58.93 g/mole

**Section 10: Stability and Reactivity**
Stability: Stable
Conditions to Avoid: ND
Materials to Avoid (Incompatibility): Hydrazinium nitrate, bromine pentafluoride, strong acids, oxidizers and acetylene.
Hazardous Decomposition Products: Toxic metal oxide fume.
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information
Results of component toxicity test performed: ORAL (LD50): Acute: 6170 mg/kg [Rat].
Human experience: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.
This product **does** contain any compounds listed by NTP or IARC or regulated by OSHA as a carcinogen.

Section 12: Ecological Information
Ecological Information: The products of degradation are as toxic as the original product.
Chemical Fate Information: ND

Section 13: Disposal Considerations
RCRA 40 CFR 261 Classification: ND. Consider recycle of material.
Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information
Solid forms: Not regulated.
For Powders only:
US DOT Information: Proper shipping name: Metal powder, Flammable, n.o.s. (Cobalt metal, powder).
Hazard Class: 4.1
Packaging group: III
UN Number: UN3089
Limitations:
IATA: Proper shipping name: Metal powder, Flammable, n.o.s. (Cobalt metal, powder).
Hazard Class: 4.1
Packaging group: III
UN Number: UN3089
Limitations: Powder only
Domestic shipments only: ND
IMO: Proper shipping name: Metal powder, Flammable, n.o.s. (Cobalt metal, powder).
Class: 4.1
UN Number: UN3089
Packaging group: III
Marine Pollutant: No
Canadian TDG: Metal powder, Flammable, n.o.s. (Cobalt metal, powder).

Section 15: Regulatory Information
United States Federal Regulations
SARA: ND
SARA Title III: ND
RCRA: ND
TSCA: Cobalt (7440-48-4) is listed on the TSCA inventory.
CERCLA: No

State Regulations
California Proposition 65: Warning! This product contains the chemical(s) for which the State of California has found to cause cancer. Listed as Cobalt metal powder (7440-48-4)

International Regulations
Canada WHMIS: CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
Europe EINECS Numbers: 231-158-0

Section 16: Other Information
European Risk and Safety Phrases: R36/38- Irritating to eyes and skin. R40- Possible risks of irreversible effects.
European symbols needed: ND
Canadian WHMIS Symbols: D-2A
HMIS® Hazard Rating: Health: 2; Fire: 1; Reactivity: 0; Personal Protection: E, (Metal Powders)
NFPA Hazard Rating: Health: 2; Fire: 1; Reactivity: 0; Personal Protection: E, (Metal Powders)
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Abbreviations used in this document
NE= Not established
NA= Not applicable
NIF= No Information Found
ND= No Data

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