

MATERIAL SAFETY DATA SHEET

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SECTION 1

PRODUCT INFORMATION

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Trade Name and Synonyms: All CARBOLOY[®] or SECO[®] cemented carbides, grade powders/powder sludges, and brazed tools

Chemical Name: Cemented Carbide Product with Cobalt Binder
Cemented Carbide Product with Nickel/Chromium binder (Grade 616)
Cemented Carbide Product with Chromium/Cobalt binder (Grades 657, 6012, 7109)
Brazed Tools using Brazing Filler Metal

Chemical Family: Refractory Metal Carbide

Molecular Weight: N/A

NFPA Hazard Rating: HEALTH 3; FLAMMABILITY 0; REACTIVITY 0; PERSONAL PROTECTION 1.

SECTION 2

HAZARDOUS INGREDIENTS

| Material (CAS #) | Percent by Weight | OSHA PEL-TWA | ACGIH TLV-TWA |
|---------------------------------------|-----------------------|-----------------------------|-----------------------------|
| Tungsten Carbide (12070-12-1) | 37.6 - 97 * | 5 mg/m ³ (as W) | 5 mg/m ³ (as W) |
| Cobalt (7440-48-4) | 3 - 25 * | 0.05 mg/m ³ | 0.02 mg/m ³ |
| Tantalum Carbide (12070-06-3) | 0 - 56.4* | 5 mg/m ³ (as Ta) | 5 mg/m ³ (as Ta) |
| Titanium Carbide (12070-08-5) | 0 - 12.6 * | 15 mg/m ³ ** | --- |
| Niobium Carbide (12011-99-3) | 0 - 4.3 * | 15 mg/m ³ ** | --- |
| Nickel (7440-02-0) | 16.0 [†] | 1 mg/m ³ | 1 mg/m ³ |
| Chromium, trivalent (7440-47-3) | 2 - 2.5 ^{††} | 0.5 mg/m ³ | 0.5 mg/m ³ |
| Aluminum Oxide Coating (1344-28-1) | 0 - 0.5 * | 15 mg/m ³ ** | 10 mg/m ³ |
| Titanium Carbide Coating (12070-08-5) | 0 - 0.5 * | 15 mg/m ³ ** | --- |
| Titanium Nitride Coating (25583-20-4) | 0 - 0.5 * | 15 mg/m ³ ** | --- |
| Silver (7440-22-4) | 50.0 ^{†††} | 0.01 mg/m ³ | 0.1 mg/m ³ |
| Copper Dust (7440-50-8) | 15.5 ^{†††} | 1 mg/m ³ | 1 mg/m ³ |
| Zinc Dust (as Zn Oxide) (1314-13-2) | 15.5 ^{†††} | 5 mg/m ³ | 10 mg/m ³ |
| Nickel Dust (7440-02-0) | 3.0 ^{†††} | 1 mg/m ³ | 1 mg/m ³ |

* Depends on Grade Specifications

** Permissible Exposure Limit for Nuisance Dust

† Grade 616

†† Grade 616, 657, 6012, and 7109

††† For brazing filler metal on brazed tools. Filler metals are hazardous only in powder form as metal or metal

| | | | |
|------------------------------------|-------------------------------------|---|-------------------------|
| Appearance and Odor: | Dark Gray Metal, Solid, Odorless | Specific Gravity (H₂O=1): | 11.85 - 15.35* 9.52† |
| Boiling Point: | N/A | Percent Volatile by Volume: | N/A |
| Vapor Pressure (mm Hg): | N/A | Evaporation Rate: | N/A |
| Vapor Density (Air=1): | N/A | How Best Monitored: | Air Sample |
| Solubility in Water: | Insoluble | | |

* Depends on Grade Specifications

† Brazing Filler Metal

SECTION 4

FIRE AND EXPLOSION HAZARD

Flash Point: N/A

Lower Explosive Limit: N/A

Upper Explosive Limit: N/A

Hard Cemented Carbide Product is not a fire hazard. Dusts generated in grinding operations or present in powders or sludges may ignite if allowed to accumulate and are subjected to an ignition source.

Extinguishing Media:

For powder fires, smother with dry sand, dry dolomite, ABC type fire extinguisher, or flood with water.

Special Fire Fighting Procedures:

For a powder fire confined to a small area, use a respirator approved for toxic dusts and fumes. For a large fire involving this material, fire fighters should use a self-contained breathing apparatus.

Unusual Fire and Explosion Hazards:

Dusts may present a fire or explosion hazard under rare favoring conditions of particle size, dispersion and strong ignition source. However, this is not expected to be a problem under normal handling conditions.

SECTION 5

REACTIVITY DATA

| | | | |
|--|---|----------------------------------|----------------|
| Stability: | Stable | Conditions to Avoid: | N/A |
| Incompatibility: | Contact of dust with strong oxidizers may cause fire or explosions. | Materials to Avoid: | Strong Acids |
| Hazardous Decomposition Products: | None | Hazardous Polymerization: | Will Not Occur |
| Conditions to Avoid: | N/A | | |

Ingestion:

If swallowing of greater than trace amounts is suspected, dilute by drinking large amounts of water. If substantial quantities are ingested, induce vomiting with Syrup of Ipecac, and seek additional medical attention.

SECTION 8 PREVENTIVE MEASURES AND SAFE HANDLING INFORMATION

Under normal operating conditions, the use of cemented carbide products does not require special safety precautions beyond normal safety procedures for handling and using cutting tools, such as safety glasses and gloves. However, operations such as grinding, cutting, burning, and welding of cemented carbide products may generate dusts, fumes, or vapors which may require special handling procedures. The procedures described below relate to these non-routine operations, as well as handling grade powders and powder sludges.

Personal Protection:

Always wear safety glasses with side shields when grinding or cutting cemented carbide products. Use a NIOSH approved respirator with high efficiency particulate air (HEPA) cartridge whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2. Wear protective gloves (leather or rubber) or Barrier Cream, and clothing (cloth or rubber) to prevent skin contact with dusts and fumes.

Ventilation:

Use adequate local (preferably) or general exhaust ventilation to ensure that concentrations of dusts, fumes, or vapors do not exceed exposure limits.

Hygienic Practices:

Wash hands thoroughly after handling, and before eating or smoking. Wash exposed skin at the end of the work shift. Smoking and consumption of food or beverages should be restricted from areas where hazardous components may be present. Do not shake clothing, rags, or other items to remove dust. Dust should be removed by laundering or vacuuming (with appropriate filters) the clothing, rags, or other items.

SECTION 9**SPILL AND DISPOSAL INFORMATION****Steps to be Taken in Case Material is Released or Spilled:**

Ventilate area of the spill. Decontaminate and/or clean up area using methods which avoid dust generation such as a high efficiency particulate air (HEPA) vacuum, wet dust mop, or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Waste Disposal Method:

Dispose of in accordance with appropriate government regulations. May be sold as scrap for reclamation.

SECTION 10**SPECIAL PRECAUTIONS****Precautions to be Taken in Handling and Storage:**

Maintain good housekeeping procedures to prevent dust accumulation during grinding. Avoid dust inhalation and direct skin contact with dust.

During normal operation and usage, cemented carbide products do not present inhalation, ingestion, or other chemical hazards of any kind. However, operations such as grinding, cutting, burning, and welding of such products may release dusts, fumes, or vapors which may present health hazards if the exposure limits described in Section 2 are exceeded. The health hazards described below relate to these non-routine operations, as well as exposure to components of grade powder or powder sludge.

Primary Routes of Entry: Inhalation; Skin Contact

Wet or dry grinding of cemented carbide products or handling powders or sludges will produce dusts or mists of potentially hazardous ingredients which can be inhaled, swallowed, or come in contact with the skin or eyes.

Acute Health Effects from Overexposure to Dusts, Fumes, and Vapors:

Dust from grinding or handling powders or sludges can cause irritation of the nose, throat, lungs, eyes, and mucous membranes. Exposure to fumes or dusts from braze filler metal may cause central nervous system effects, irritation of the eyes, lungs, mucous membranes, and metal fume fever (metallic taste in mouth, throat irritation, and influenza like symptoms).

Chronic Health Effects from Overexposure to Dusts, Fumes, and Vapors:

Chronic exposure to dusts, fumes and mists containing Cobalt carry the potential to cause permanent respiratory diseases, including occupational asthma, interstitial pneumonitis and fibrosis (hard-metal disease), and emphysema. Symptoms include productive cough, wheezing, dyspnea upon exertion, pleuritic chest pain, and weight loss. Skin sensitization is also noted in a small percentage of cases. Reports outside the industry suggest that ingestion of significant amounts of cobalt can cause blood, heart, and other organ problems.

Chronic exposure to Cadmium dusts and fumes may cause mild anemia, inflammation of the nose and throat, behavioral disorders (sleeplessness, loss of appetite, etc.), and significant renal peritubular damage. Cadmium has exhibited teratogenic effects in rats, mice, and hamsters; whether it does so in humans is not known.

Chronic exposure to Nickel dusts and fumes may cause pulmonary irritation and pneumonitis or sensitization dermatitis.

Individuals with Wilson's disease may wish to limit occupational exposure to copper dust.

Carcinogenicity:

Chromium and Nickel are listed by IARC and NTP as Human Carcinogens. Cadmium dust is listed by IARC, OSHA, and NTP as a Probable Human Carcinogen. Cobalt is listed by IARC and ACGIH as a possible animal carcinogen.

SECTION 7

FIRST AID MEASURES

Inhalation:

If symptoms of pulmonary involvement develop (coughing, wheezing, dyspnea, etc.), remove from exposure and seek medical attention.

Skin Contact:

If irritation or rash occurs, thoroughly wash affected area with soap and water and isolate from exposure. If irritation persists, seek medical attention.

Eye Contact:

Flush eyes with water for at least ten minutes. If irritation persists, seek medical attention.

Other Precautions:

Clean up using methods which avoid dust generation such as a HEPA vacuum, wet dust mop, or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Note:

Periodic medical monitoring is recommended for individuals regularly exposed to dust or fumes, with particular attention paid to any potential sensitization effects of such substances.

SECTION 11**REGULATORY COMPLIANCE (United States)**

| Regulation | Cadmium | Chromium (3+) | Cobalt | Copper | Nickel | Silver | Zinc |
|---|---------|------------------|--------|----------|---------|----------|----------|
| CERCLA | RQ-10# | RQ-5000# | | RQ-5000# | RQ-100# | RQ-1000# | RQ-1000# |
| SARA Title III § 313 | X | X | X | X | X | X | X |
| RCRA Waste # | D006 | D007 | | | | D011 | |
| Banned California List (Land Ban Disposal) | X | X | | | X | X | |
| CWA 307 | X | X | | X | X | X | X |
| MI Critical Material | X | X | X | X | X | X | X |
| CA Prop 65 | X | X | X | X | X | X | X |

SECTION 12**USER'S RESPONSIBILITIES**

This Material Safety Data Sheet provides information consistent with recommended applications of these products and anticipated non-routine activities involving the product. It is the user's responsibility to identify and protect against health and safety hazards presented by modification of cemented carbide products, powders or sludges after manufacture. Individuals handling cemented carbide products, powders or sludges should be informed of all relevant hazards and recommended safety precautions, and should have access to the information contained in this MSDS.

SECTION 13**DISCLAIMER**

The information contained herein is based upon data provided by manufacturers and suppliers of raw materials used in the manufacture of cemented carbide products, powders or sludges. The information is offered in good faith as accurate and correct, but no representations, guarantees, or warranties of any kind are made as to its accuracy or completeness, suitability for particular applications, hazards connected with the use of the product, or the results to be obtained from the use thereof. User assumes all risk and liability of any use or handling of any material beyond Carboloy Inc's. control. Variations in methods, conditions, equipment used to store, handle, or process the material, and hazards connected with the use of the product are solely the responsibility of the user and remain at its sole discretion.

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