



# MATERIAL SAFETY DATA SHEET

SECTION 1

COMPANY AND PRODUCT INFORMATION

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**Product Name:** Cemented Tungsten Carbide Cutting Tool Products - Coated or Uncoated

**Product Descriptions:** All cemented carbide round tool products such as drills, end mills and other cutting tool products including polycrystalline diamond and cubic boron nitride on a tungsten carbide substrate.

**Manufacturer:** Precision Dormer Supply  
301 Industrial Avenue  
Crystal Lake, IL 60012

**Date Prepared:** July 2, 2009

**Emergency Telephone:** 800-877-3745

**Non-Emergency Telephone:** 815-459-2040

**Non-Emergency Fax:** 815-459-2804

**NFPA Hazard Rating:** HEALTH 1; FLAMMABILITY 0; REACTIVITY 0.

SECTION 2

COMPOSITION, INFORMATION ON INGREDIENTS

Material (CAS #)	Percent by Weight*	OSHA PEL-TWA	ACGIH TLV-TWA
Tungsten carbide (12070-12-1) (Limit as W)	7 - 97	---	5 mg/m <sup>3</sup>
Cobalt (7440-48-4)	0 - 30	0.1 mg/m <sup>3</sup>	0.02 mg/m <sup>3</sup>
Nickel (7440-02-0)	0 - 20	1.0 mg/m <sup>3</sup>	1.5 mg/m <sup>3</sup>
Tantalum carbide (12070-06-3) (Limit as Ta)	0 - 57	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>
Titanium (134563-67-7) (Limit as TiO <sub>2</sub> )	0 - 53	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Titanium carbide (12070-08-5) (Limit as TiO <sub>2</sub> )	0 - 13	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Molybdenum carbide (12069-89-5) (Limit as Mo)	0 - 15		
Molybdenum disulfide (7439-98-7)(Limit as Mo)	0 - 2		
	(Mo Insoluble – Inhalable Fraction)	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
	(Mo Insoluble – Respirable Fraction)	---	3 mg/m <sup>3</sup>
Niobium carbide (12011-99-3)	0 - 12	---	---
Chromium Carbide (12012-35-0) (Limit as Cr)	0 - 5	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Vanadium carbide (11130-21-5) (Limit as V <sub>2</sub> O <sub>5</sub> )	0 - 5	0.5 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>
Chromium, trivalent (7440-47-3)	0 - 3	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Boron (1303-86-2) (Limit as B <sub>2</sub> O <sub>3</sub> )	0 - 2	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Zirconium (7440-67-7)	0 - 2	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>
Iron (1309-37-1) (Limit as Fe <sub>2</sub> O <sub>3</sub> )	0 - 2	10 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>
Hafnium carbide (7440-58-6)	0 - 1	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Polycrystalline diamond (7782-40-3)	0 - 50	---	---
Cubic boron nitride (10043-11-5)	0 - 50	---	---
<b>May be coated with any of the following material (CAS #)</b>	<b>Percent by Weight*</b>	<b>OSHA PEL-TWA</b>	<b>ACGIH TLV-TWA</b>
Aluminum oxide (1344-28-1)	0 - 0.5	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Titanium aluminum nitride (108398-79-4)	0 - 0.5	---	---
Titanium nitride (25583-20-4)	0 - 0.5	---	---
Titanium carbonitride (12627-33-7)	0 - 0.5	---	---

**Notes:**

\* Exact Percentages Depend on Grade Specifications

--- Not established

**Emergency Overview:**

During normal operation and usage, cemented carbide products do not present inhalation, ingestion, or other chemical hazards. 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 component materials.

**Primary Routes of Entry:** Inhalation, ingestion, skin contact

Wet or dry grinding of cemented carbide products will produce dusts of potentially hazardous ingredients which can be inhaled, swallowed, or come in contact with the skin or eyes. During wet grinding, the dust can be suspended or dissolved in the coolant mist.

**Acute Health Effects:**

Dust from grinding can cause irritation of the nose, throat, lungs, eyes, and mucous membranes. Skin exposure can cause an allergic red rash (cobalt itch).

**Chronic Health Effects:**

Chronic exposure to respirable dust containing cobalt and tungsten 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 effects.

**Carcinogenicity (OSHA , NTP, IARC, ACGIH):**

Cobalt metal with tungsten carbide is listed by IARC as Group 2A - probably carcinogenic to humans. Nickel is listed by IARC as Category 2B – possibly carcinogenic to humans. Cobalt is listed by ACGIH as an animal carcinogen (A3). Cobalt and nickel are known to the State of California to cause cancer. Nickel is considered reasonably anticipated to be a carcinogenic by NTP.

## SECTION 4

## FIRST AID MEASURES

**Inhalation:**

If symptoms of pulmonary involvement develop (coughing, wheezing, dyspnea, etc.), remove to fresh air. If symptoms persist, seek medical attention.

**Skin Contact:**

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

**Eye Contact:**

Remove contact lenses at once. Flush eyes with water for at least fifteen minutes. If irritation persists, seek medical attention.

**Ingestion:**

If substantial quantities are swallowed, dilute with large amount of water. Induce vomiting and seek medical attention.

## SECTION 5

## FIRE FIGHTING MEASURES

**Flash Point:** Not applicable      **Lower Explosive Limit:** Not applicable      **Upper Explosive Limit:** Not applicable

Cemented carbide products are not a fire hazard under normal conditions of use. However, dusts generated in grinding may be sensitive to static discharge or ignite if allowed to accumulate and then are exposed to an ignition source.

**Extinguishing Media:**

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

**Special Fire Fighting Procedures:**

For a dust 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. See Section 3 and 8 for specific hazard identification and exposure control measures.

**Unusual Fire and Explosion Hazards:**

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

**Hazardous Combustion Products:**

Oxides of aluminum, cobalt, titanium, and tungsten; carbon dioxide, and carbon monoxide. See Section 3 for specific hazard identification.

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

**Steps to be Taken in Case Material is Released or Spilled:**

Clean up area using methods that avoid dust generation such as a high efficiency particulate air (HEPA) vacuum, wet dust mop, or wet clean-up. Use an appropriate National Institute of Occupational Safety and Health (NIOSH)-approved respirator whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2.

## SECTION 7

## HANDLING AND STORAGE

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 or fumes which may require special handling procedures. The procedures described below relate to these non-routine operations.

**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.

**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. See Section 3 for specific health hazards.

**Other Precautions:**

Clean up using methods that avoid dust generation such as a HEPA vacuum, wet dust mop, or wet clean-up. Use a NIOSH-approved respirator whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2. See Section 3 for specific health hazards.

**Note:**

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

**Personal Protection:**

Always wear safety glasses with side shields when grinding or cutting cemented carbide products. Use a NIOSH-approved respirator, with the proper assigned protection factor, whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2. Protective gloves or barrier cream, and clothing to prevent skin contact with dusts are recommended. See Section 3 for specific health hazards.

**Ventilation:**

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

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance and Odor:</b>	Dark Gray Solid, Odorless	<b>Specific Gravity (H<sub>2</sub>O=1):</b>	Not applicable
<b>Boiling Point:</b>	Not applicable	<b>Percent Volatile by Volume:</b>	Not applicable
<b>Vapor Pressure (mm Hg):</b>	Not applicable	<b>Evaporation Rate:</b>	Not applicable
<b>Vapor Density (Air=1):</b>	Not applicable	<b>Solubility in Water:</b>	Insoluble

## SECTION 10

## STABILITY AND REACTIVITY

**Stability:** Stable

**Hazardous Decomposition Products:** None

**Conditions to Avoid:** None known

**Hazardous Polymerization:** Will Not Occur

**Incompatibility:** Strong acids. Contact of dust with strong oxidizers may cause fire or explosions.

## SECTION 11

## TOXICOLOGICAL INFORMATION

**Cobalt:** The International Agency for Research on Cancer (IARC) lists cobalt metal with tungsten carbide as Group 2A - probably carcinogenic to humans. Cobalt fumes or dust may cause pulmonary, skin, or eye irritation. Cobalt may be a sensitizing agent for skin and respiratory system. Chronic exposure may affect the heart, pancreas, thyroid gland, or bone marrow.

Rat Oral LD<sub>50</sub>: 1500 mg/kg

Rabbit Oral LD<sub>50</sub>: 20 mg/kg

Rat Intraperitoneal LD<sub>50</sub>: 250 mg/kg

Rabbit Intratracheal LD<sub>50</sub>: 100 mg/kg

Rat Intravenous LD<sub>50</sub>: 100 mg/kg

**Nickel:** The International Agency for Research on Cancer (IARC) lists metallic nickel and nickel compounds as Category 2B carcinogens (Possibly Carcinogenic to Humans). Epidemiological studies indicate increased incidence of cancer of the nasal cavity, lungs, and possibly the larynx in nickel refinery workers. Nickel is an eye, skin, and mucous membrane irritant and a pulmonary and skin sensitizer.

Rat Oral LD<sub>50</sub>: 5 mg/kg

Dog Intravenous LD<sub>50</sub>: 10 mg/kg

Guinea Pig Subcutaneous LD<sub>50</sub>: 500 mg/kg

Rat Intratracheal LD<sub>50</sub>: 12 mg/kg

Mouse Intravenous LD<sub>50</sub>: 50 mg/kg

**Tungsten carbide, titanium carbide, niobium carbide, vanadium carbide:** Toxicity has not been quantified. May cause pulmonary and skin sensitization and mucous membrane irritation in dust form.

There is inadequate evidence for the carcinogenicity of chromium (7440-47-3) and most trivalent chromium compounds in experimental animals.

**Aquatic toxicity**

Cobalt:	Algae ( <i>Selenastrum capricornutum</i> ):	EC <sub>10</sub> 72h: 0,006 mg/l EC <sub>50</sub> 72h: 0,035 mg/l NOEC 72h: 0,0053 mg/l
Cobalt:	Daphnia (Magna):	EC <sub>50</sub> 48h: > 100 mg/l
	Fish ( <i>Brachydanio rerio</i> ):	NOEC 96h: > 100 mg/l
	Bacteria (activated sludge):	EC <sub>50</sub> : 42 mg/l
Tungsten carbide:	Algae ( <i>Scenedesmus subspicatus</i> ):	EC <sub>50</sub> 72h: 130 mg/l (grow rate)
	Daphnia (Magna):	EC <sub>50</sub> 48h: > 1000 mg/l
	Fish ( <i>Brachydanio rerio</i> ):	LC <sub>0</sub> 96h: > 1000 mg/l LC <sub>50</sub> 96h: > 1000 mg/l
	Bacteria (activated sludge):	EC <sub>20</sub> 3h: >1000 mg/l EC <sub>50</sub> 3h: >1000 mg/l

## SECTION 13

## DISPOSAL CONSIDERATIONS

**Waste Disposal Method:**

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

## SECTION 14

## TRANSPORTATION INFORMATION

DOT Proper Shipping Name:	Not regulated by this mode of transportation
IMO Proper Shipping Name:	Not regulated by this mode of transportation
IATA Proper Shipping Name:	Not regulated by this mode of transportation
AFI Prop. Shipping Name:	Not regulated by this mode of transportation

## SECTION 15

## REGULATORY INFORMATION

**OSHA:**

This product, under normal conditions of use, is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dust generated while grinding, cutting, burning or welding this product may be hazardous as noted in Sections 2 and 3.

**TSCA:**

Components of this product are listed on the TSCA inventory.

**SARA:**

Chromium and cobalt are subject to the requirements of Section 313 of Title III of Superfund Amendment and Reauthorization Act of 1986.

**State Regulatory Information:**

This product may contain cobalt and/or nickel, which is listed in California Proposition 65 as a known cancer-causing chemical.

Users 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 after manufacture. Individuals handling cemented carbide products should be informed of all relevant hazards and recommended safety precautions, and should have access to the information contained in this MSDS.

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. 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 Precision Dormer'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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