

KENNAMETAL INC. MATERIAL SAFETY DATA SHEET

MSDS # C512

K-1238-512

Date of Issue: 07/10

Supersedes: 06/07

Original Date: 10/88

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: K1, K92, K94, K94N, KZ94, KC250, KC720, MD4, KC9240

Chemical Name: Tungsten Carbide product with Cobalt Binder

Synonyms: Hard Metal, Cemented WC, Tungsten Carbide

Product Use: Metalworking Tools, Metallurgical Products

Manufacturer: Kennametal Inc.

P.O. Box 231

Latrobe, PA 15650 USA

Supplier: Kennametal Ltd.

6497 Edwards Blvd.

Mississauga, Ontario, L5T 2V2 CANADA

EMERGENCY TELEPHONE NUMBER: CHEMTREC

Domestic Shipments: 1-800424-9300

Shipments outside the US: 703-527-3887

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Material	CAS Number	% by Weight	OSHA PEL	ACGIH TLV	NFPA HAZARD RATING SCALE 0-4		
			TWA (mg/m ³)	TWA (mg/m ³)	Health	Reactivity	Fire
Tungsten Carbide (WC)	12070-12-1	60-100	5	5	No NFPA Rating	0	0
Cobalt (Co) *	7440-48-4	10-30	0.1	0.02	1	3	0
Tantalum Carbide (TaC)	12070-06-3	1-5	5	5	No NFPA Rating	0	0
Titanium Carbide (TiC)	12070-08-5	0.1-1.0	5	None Established	No NFPA Rating	0	0
Niobium Carbide (NbC)	12069-94-2	0.1-1.0	5	None Established	No NFPA Rating	0	0

*The adopted exposure limit for Cobalt in British Columbia is 0.02 mg/m³.

SECTION 3 - HAZARDS IDENTIFICATION

In the form of a powder, this odorless, colorless, gray material may be flammable and may cause respiratory and/or skin irritation. Overexposure to this material in the form of metallurgical powder, dust or mist from grinding or sweeping is hazardous to health. Cobalt is an eye, skin, and mucous membrane irritant and may cause temporary or permanent respiratory disease. Permanent respiratory disease can lead to disability or death. Certain pulmonary and skin conditions may be aggravated by exposure. Preexisting pulmonary and skin conditions such as emphysema, asthma, bronchitis and dermatitis may be aggravated by exposure to this material.

Inhalation: Irritant/sensitizer.

Cobalt: 20 mg(Co)/m³ is immediately dangerous to life and health. Inhalation may cause irritation of the nose and throat.

Acute Overexposure: This material in the form of dust or mist from grinding may cause coughing dyspnea, soreness in the chest, weight loss, hemoptysis, bronchitis, asthma, pulmonary fibrosis. Radiological changes may be noticed in the lungs. May also cause shortness of breath, wheezing, interstitial pneumonitis, and/or lung densities.

Chronic Overexposure: This material in the form of dust or mist from grinding may cause symptoms as described in acute exposure. May cause fibrosis or pneumoconiosis, sensitization of the respiratory tract, obstructed airways syndrome, interstitial lung disease, and density of the lung.

Skin Contact: Irritant/sensitizer

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Acute Overexposure: This material in the form of dust or mist from grinding may cause irritation with dermatitis, eczema, and itching. May also cause sensitization dermatitis if previously exposed. A rash may develop, usually in flexor areas of the elbow, neck and face.

Chronic Overexposure: This material in the form of dust or mist from grinding may cause contact dermatitis. Sensitization dermatitis may follow prolonged contact.

Eye Contact: Irritant

Acute Overexposure: This material in the form of dust or mist from grinding may cause irritation with redness, pain and itching.

Chronic Overexposure: This material in the form of dust or mist from grinding may cause conjunctivitis.

Ingestion: Irritant

Acute Overexposure: This material in the form of dust or mist from grinding may cause gastrointestinal irritation. Large doses may cause diarrhea. May cause hypotension, pain, vomiting, and sensations of hotness or nausea. Severe exposure may cause pericardial effusion, convulsions, or enlargement of the thyroid.

Chronic Overexposure: This material in the form of dust or mist from grinding may adversely affect the pancreas, thyroid gland, heart, or bone marrow.

SECTION 4 - FIRST AID MEASURES

Inhalation: If symptoms of pulmonary involvement develop (coughing, wheezing, shortness of breath), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention immediately.

Skin Contact: If irritation or rash occurs, remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of material remains (approximately 15-20 minutes). Get medical attention.

Eye Contact: If irritation occurs, wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of material remains (approximately 15-20 minutes). Get medical attention immediately.

Ingestion: If this material has been swallowed and person is conscious, immediately give person large amounts of water. After water has been swallowed, induce vomiting. Do not attempt to make an unconscious person drink or vomit. Get medical attention immediately.

SECTION 5 - FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Under rare favoring conditions, finely divided powder or dust from grinding is expected to be a fire and explosion hazard when exposed to high temperatures or ignition sources. Particle size and dispersion in air determine reactivity. This product, except as powder or dust, is not a fire hazard.

Flash Point: Not applicable

Firefighting Media: For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fire extinguishing media appropriate to fight surrounding fire.

Special Firefighting Procedures: Move container from fire area if possible. Cool containers exposed to flame with water from side until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, or withdraw and let fire burn. Use powdered sodium chloride, or suitable dry powder. Avoid breathing fumes from burning material. Firefighting personnel must use proper respiratory protection and protective fire suits.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled: Sweep up with minimum amount of dust generation and place in suitable clean, dry containers for later disposal or reclamation. Residue should be cleaned up using a high efficiency particulate filter vacuum or wet clean up. Use appropriate respiratory protection.

SECTION 7 - HANDLING AND STORAGE

Handling and Storage: Minimize free fall of powder and avoid dispersion of dust in air. Finely divided particles, dust, or fumes may be flammable or explosive. Keep away from sparks or ignition sources. Contents should be stored in a clean, cool area.

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Other Precautions: Wash hands thoroughly after handling, before eating or smoking. Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or vacuuming. Periodic examinations are recommended for individuals regularly exposed to dust or mist.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Provide local exhaust ventilation or general dilution to maintain exposure levels below the PEL and TLV.

Respiratory Protection:

Cobalt

0.05 mg (Co)/m³: Single-use approved dust and mist respirator.

0.5 mg (Co)/m³: Dust mask, except single-use respirator.

1 mg (Co)/m³: Dust mask, except single-use and quarter-mask respirators. Fume or high-efficiency particulate respirator.

5 mg (Co)/m³: High-efficiency particulate respirator with a full facepiece. Supplied-air respirator with a full facepiece, helmet or hood. Self-contained breathing apparatus with a full facepiece.

20 mg (Co)/m³: Powered air-purifying respirator with high-efficiency filter with full facepiece. Type "C" supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode.

Firefighting: Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive-pressure mode.

Clothing: Employee must wear appropriate protective clothing and equipment to prevent repeated or prolonged skin contact with this substance. Soiled clothing should be laundered separately.

Gloves: Employee must wear appropriate protective gloves or barrier creams to prevent contact with this substance.

Eye Protection: Safety glasses with side shields or goggles are recommended. Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use. Contact lenses should not be worn when handling these materials.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Odourless gray powder or solid.

Boiling Point: 2870° C (5198° F)

Solubility in Water: Practically insoluble

Melting Point: 1495° C (2723° F)

Petroleum Based Solvent Solubility: Practically insoluble

Specific Gravity: (H₂O = 1): 12.5 to 15.0

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressure.

Decomposition: Thermal decomposition may release acrid smoke and irritating fumes.

Incompatibilities:

Tungsten Carbide:

Chlorine Trifluoride: Reacts with a flame.

Fluorine: Incandescens.

Nitrogen Dioxide, Nitrous Oxide: Burns with incandescence if heated to dull red.

Iodine Pentafluoride, Lead Oxide: Violent reaction.

Cobalt:

Ammonium Nitrate and Metals or Bromine Pentafluoride: Reacts violently and sometimes explosively.

Hydrazinium Nitrate: Decomposes explosively upon rapid heating.

Nitryl Fluoride, Acetylene: Reacts incandescently.

Tantalum Carbide:

Serious reactivity hazard with strong oxidants.

Titanium Carbide / Niobium Carbide: None known.

SECTION 11 - TOXICOLOGICAL INFORMATION

Cobalt: Carcinogenic status: The International Agency for Research on Cancer (IARC) lists Cobalt and Cobalt compounds as a Category 2B (Possibly Carcinogenic to Humans) carcinogen. 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 LD₅₀: 1500 mg/kg.

Rabbit Oral LD₅₀: 20 mg/kg

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Rat Intraperitoneal LD_{Lo}: 250 mg/kg

Rabbit Intratracheal LD_{Lo}: 100 mg/kg

Rat Intravenous LD_{Lo}: 100 mg/kg

SECTION 12 - ECOLOGICAL INFORMATION

No data are available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method: This is a valuable material that should be sent to an appropriate reclamation facility if available. If material cannot be sent to a reclamation facility, disposal should be made in compliance with federal, provincial/state, and local environmental regulations.

SECTION 14 - TRANSPORT INFORMATION

Some finely divided powder may be classified as 'flammable solid' according to the Department of Transportation and International Air Transportation Association guidelines. If a regulated powder is resold and shipped in the same physical form it was received, appropriate labeling, marking, documenting, and placarding must accompany the shipment.

SECTION 15 - REGULATORY INFORMATION

In the form of a pressed and sintered item, this is a manufactured article and is not a "controlled product" under WHMIS. Some ingredients in Kennametal products, including Cobalt, Nickel, Copper, Chromium and Chromium Compounds, are subject to the requirements of Section 313 of Title III of Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

SECTION 16 - OTHER INFORMATION

Although Kennametal Inc. has attempted to provide current and accurate information herein, Kennametal Inc. makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

For free powder handling or metallurgical safety booklets write: Kennametal Inc., MSDS Coordinator, P.O. Box 231, Latrobe, PA 15650

For technical information contact Corporate EHS, phone 724-539-5066 or fax 724-539-5372.

To purchase Kennametal products call 1-800-446-7738.

For additional MSDSs or any other information, contact Kennametal Toronto, phone 905-564-4663 and visit our website at www.kennametal.com.

Prepared by: Hazard Communication Committee and ERM.

**MATERIAL SAFETY DATA SHEET**MSDS # 002
K-0963-002Revision Date: 07/11/11
Supersedes: 06/28/11**1. PRODUCT AND COMPANY IDENTIFICATION**

Product Names/Powder Grades Group A:	621, 714, 716, 914, 916, CY14, CY16, CY16SC, CY21, CY30M, P25, P2F, P35, R611, R612, R613
Group B:	CP1, K2S, K2SX02, K2SX62, K4H, K4H-M, K4HSC, K4HX02, KC740, M05, M10, M20, P20, SP97C9, S950
Group C:	K21, K21C, K21X02, K2884, K2884SC, K2884X02, K2884Y62, K420, K420X01, K420X03, K420X62, KC710, KC810, KC820, S107, S107SC, S107Y22
Group D:	718, 725, 918, 925, CF3, CM2, CP3, CY25, CY7, K40, KC415M, KC5115RR, KC6920, KC792M, KC9010, KC9025, KC9040, KC9040SC, KC9040X02, KC910, KC9125, KC9140, KC9210, KC9125RR, KC9215, KC9325, KC935, KC950, KC950SC, KC950X02, KC950X03, KC990, KCM25, KCP25, KCP30, KCP40, S102, S102SC, S102X02, S110, S102D805, SP97C3, S123, S125X02, S125X03, S125TJ, SPB7EN
Group E:	CM4, CM5, K10, K20, KM1
Group F:	CY11
Group G:	KW109
Group H:	KC8050, S111SC, S111SCW, S111X02
Group I:	CG6, KC850, KC850SC, KC850X02, KC850X03, KC9240, RC706, RC906, S104, S108, S108SC, S108X02, S108X03
Group J:	CY9, K5H, K5HX02, K7H, K7H-M, K7HX02
Group K:	K3030C
Group L:	K91, K91-M, K91X02, K91X62, K91X62
Group M:	CA1, CM3, KC7040, KC7045, KC7245, P40, P50, PVA, PVN DRILL, WM25CT
Group N:	K84, K84X02, K84X04, K84X62, K84Y62, KC7140, KC840, KM
Group O:	717, 917, CY17, K125M, K2885, K2885SC, K2885X02, K2885X04, K2885Y62, KC715M, SP29CV
Group P:	K82, K82SC, K82X02, K82Y02, K82Y62
Group Q:	731, 931, CY31, K45, K45SC, K45X01, K45X03
Group R:	P10
Chemical Name:	Tungsten Carbide product with Cobalt binder
Synonyms:	Hard Metal, Cemented WC, Tungsten Carbide
Chemical Family:	Metal mixture
Formula:	Not applicable - mixture
Product Use:	Metalworking Tools, Metallurgical Products, Powders and Inserts

COMPANY ADDRESS
Kennametal Inc.
1600 Technology Way
P.O. Box 231
Latrobe, PA 15650

ADDITIONAL MSDS:
724-539-5000
TECHNICAL INFORMATION:
724-539-5066

EMERGENCY TELEPHONE NUMBER:
CHEMTREC: 1-800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Group A % by Wt	Group B % by Wt	Group C % by Wt	Group D % by Wt	Group E % by Wt	Group F % by Wt
*Tungsten Carbide (WC)	12070-12-1	60 – 100	60 – 100	60 – 100	60 – 100	60 – 100	60 – 100
Cobalt (Co)	7440-48-4	5 – 10	5 – 10	5 – 10	5 – 10	5 – 10	5 – 10
*Tantalum Carbide	12070-06-3	5 – 10	1 – 5	5 – 10	1 – 5	0.1 – 1	0.1 – 1
*Titanium Carbide	12070-08-5	5 – 10	1 – 5	5 – 10	1 – 5	0.1 – 1	10 – 30
*Niobium Carbide	12069-94-2	3 – 7	3 – 7	1 – 5	1 – 5	0.1 – 1	0.1 – 1

Components	CAS Number	Group G % by Wt	Group H % by Wt	Group I % by Wt	Group J % by Wt	Group K % by Wt	Group L % by Wt
*Tungsten Carbide (WC)	12070-12-1	60 – 100	60 – 100	60 – 100	60 – 100	60 – 100	60 – 100
Cobalt (Co)	7440-48-4	5 – 10	5 – 10	3 – 7	3 – 7	10 – 30	10 – 30
*Tantalum Carbide	12070-06-3	1 – 5	1 – 5	1 – 5	3 – 7	0.1 – 1	1 – 5
*Titanium Carbide	12070-08-5	0.1 – 1	1 – 5	1 – 5	10 – 30	0.1 – 1	0.1 – 1
*Niobium Carbide	12069-94-2	0.1 – 1	0.1 – 1	1 – 5	1 – 5	0.1 – 1	0.1 – 1

Components	CAS Number	Group M % by Wt	Group N % by Wt	Group O % by Wt	Group P % by Wt	Group Q % by Wt	Group R % by Wt
*Tungsten Carbide (WC)	12070-12-1	60 – 100	60 – 100	60 – 100	60 – 100	60 – 100	40 – 70
Cobalt (Co)	7440-48-4	10 – 30	10 – 30	10 – 30	10 – 30	3 – 7	7 – 13
*Tantalum Carbide	12070-06-3	1 – 5	5 – 10	5 – 10	1 – 5	5 – 10	7 – 13
*Titanium Carbide	12070-08-5	1 – 5	1 – 5	5 – 10	5 – 10	5 – 10	7 – 13
*Niobium Carbide	12069-94-2	1 – 5	1 – 5	1 – 5	1 – 5	1 – 5	7 – 13

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Components	OSHA PEL (mg/m ³)	ACGIH TLV-TWA (mg/m ³)	Canadian Provincial Limits (mg/m ³)
*Tungsten Carbide (WC)	15	10	None
Cobalt (Co)	0.1	0.02	Alberta (TWA): 0.05 mg/m ³ ; STEL – 0.1 mg/m ³ British Columbia (TWA): 0.02 mg/m ³ ; K3 (possible human carcinogen): Sensitizer; reduce exposure to minimum possible level Manitoba, New Brunswick, Quebec (TWA/TWAEV): 0.05 mg/m ³ Ontario (TWAEV): 0.02 mg/m ³ Saskatchewan (TWA): 0.02 mg/m ³ ; STEL – 0.06 mg/m ³ Yukon (TWA): 0.05 mg/m ³
*Tantalum Carbide	15	10	None
*Titanium Carbide	15	10	None
*Niobium Carbide	15	10	None

*This substance is regulated by OSHA as a Particulate Not Otherwise Regulated (PNOR). The exposure limits listed for both OSHA and ACGIH refer to total dust; the OSHA PEL for the respirable fraction is 5 mg/m³.

Additional Exposure Standards: None
 OSHA REGULATORY STATUS: In solid form, not hazardous. Powder, dust or fume: irritant, lung and respiratory tract toxin, sensitizer

In solid form, this material is not hazardous (tools, inserts). Powder or dust generated from grinding of tools or inserts and fumes generated from high-temperature processes are hazardous materials.

3. HAZARDS IDENTIFICATION

WARNING!

USE ONLY WITH ADEQUATE VENTILATION. HARMFUL IF INHALED. EXPOSURE TO DUST, POWDER, OR FUMES CAN CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. DUST OR POWDER CAN CAUSE RESPIRATORY SYSTEM DAMAGE. MAY CAUSE AN ALLERGIC SKIN AND/OR RESPIRATORY REACTION. KEEP CONTAINERS CONTAINING POWDER CLOSED. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING.

HAZARD RATINGS (For powder or dust)
 Hazardous Materials Identification System (HMIS) Degree of hazard (0 = low, 4 = extreme)
 National Fire Protection Association (NFPA) Health: 3* Flammability: 0 Reactivity: 0 Personal Protection: E
 Mixture. Not rated.

HUMAN THRESHOLD RESPONSE DATA

Odor Threshold: Unknown
 Irritation Threshold: Unknown
 Immediately Dangerous to Life or Health (IDLH) Value(s): The IDLH for this product is not known. The IDLH for cobalt is 20 mg/m³.

POTENTIAL HEALTH EFFECTS

ACUTE EFFECTS

- Eye: Powder or dust can cause irritation consisting of redness, swelling, and pain. May cause conjunctivitis with repeated exposures.
- Skin: Material not expected to be absorbed through the skin. Contact with dust or powder may cause irritation consisting of redness and/or swelling.
- Inhalation: Harmful if inhaled. Inhalation of high concentrations of powder, dust, or fume may cause respiratory and nasal irritation, coughing, and difficulty breathing.

Ingestion: Ingestion of large amounts of dust or powder may cause nausea, diarrhea and or stomach pain.

CHRONIC EFFECTS:

Prolonged or repeated skin contact with powder or dust may cause more severe irritation or dermatitis. Prolonged or repeated inhalation of powder, dust or fume may cause more severe irritation and possibly lung damage. Chronic exposure to dust or powder may also lead to the development of permanent, severe, obstructive or fibrotic lung disease characterized by coughing, wheezing, and shortness of breath. Repeated contact with powder or dust may cause an allergic skin reaction consisting of itching, redness, swelling, and rash or urticaria (hives) in sensitized individuals. Prolonged or repeated inhalation of powder, dust or fume may cause an allergic type of asthma reaction characterized by wheezing, coughing, and extreme breathing difficulty in sensitized individuals. Ingestion of large amounts of cobalt may affect the heart, but this type of exposure is not anticipated under normal occupational conditions.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Exposure to dust or powder may aggravate an existing dermatitis, asthma, emphysema, and other respiratory disease.

POTENTIAL ENVIRONMENTAL EFFECTS

None known. Product has not been tested for environmental properties.

4. FIRST AID MEASURES

PROCEDURES

EYE CONTACT: In case of contact, flush eyes with plenty of water for at least 15 minutes. If irritation persists, get medical attention.

SKIN CONTACT: In case of contact, wash skin with plenty of water. Remove contaminated clothing and shoes and launder before reuse. If skin irritation develops and persists or recurs, get medical attention.

INHALATION: If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention.

INGESTION: If swallowed, and person is conscious, immediately give person large amounts of water. Get medical attention. Never give anything by mouth to an unconscious or convulsing person. Induce vomiting only if instructed by a physician.

NOTE TO PHYSICIANS If ingested, administer medicinal absorbent charcoal. In case of respiratory difficulty, administer oxygen therapy. Check victim's state of consciousness, breathing and pulse, and administer CPR if indicated. There is no specific antidote to the active ingredients in this product; use symptomatic treatment.

5. FIRE FIGHTING MEASURES

Property	Value	Property	Value
Flash Point (°C):	Not applicable	Burning Rate of Material:	Not applicable
Lower Explosive Limit:	Not applicable	Autoignition Temp.:	Not applicable
Upper Explosive Limit:	Not applicable	Flammability Classification: (defined by 29 CFR 1910.1200)	Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS: None expected.

EXTINGUISHING MEDIA: For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fire-extinguishing media appropriate to fight surrounding fire.

SPECIAL FIREFIGHTING PROCEDURES: Move container from fire area if possible. Cool containers exposed to flame with water from side until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, or withdraw and let fire burn. Use powdered sodium chloride, or other suitable dry powder. Avoid breathing fumes from burning material. Fire-fighting personnel should use proper respiratory protection and protective fire suits including self-contained breathing apparatus with a full face-piece operated in pressure-demand or other positive-pressure mode.

6. ACCIDENTAL RELEASE MEASURES

For transportation-related and large spills call **CHEMTREC: 1-800-424-9300**. For small spills, using protective equipment as prescribed in Section 8, sweep up with minimum amount of dust generation and place in suitable clean, dry containers for later disposal or reclamation. Residue should be cleaned up using a high efficiency particulate filter (HEPA) vacuum or wet clean up. Dispose in accordance with Section 13.

7. HANDLING AND STORAGE

HANDLING: No smoking, eating, or drinking while using this product. Wash hands thoroughly after handling. Minimize free fall of powder and avoid dispersion of dust in air. Contents should be stored in a clean, cool area.

STORAGE: Contents should be stored in a clean, cool area.

OTHER PRECAUTIONS: Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or HEPA vacuuming.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide local exhaust ventilation or general dilution ventilation to maintain exposure levels below the PEL and TLV.

EYE / FACE PROTECTION: Safety glasses with side shields or goggles are recommended. An eye wash fountain should be available within the immediate work area. Contact lenses should not be worn when handling these materials.

SKIN PROTECTION: Wear impervious gloves and other protective clothing (aprons, coveralls) as appropriate to prevent skin contact when using this product. Wash thoroughly after handling, especially before eating, drinking, or smoking.

RESPIRATORY PROTECTION: If exposures above the PEL/TLV are possible, use a NIOSH-approved half-face or full-face respirator equipped with High Efficiency Particulate (HEPA) filter cartridges.

GENERAL HYGIENE CONSIDERATIONS: Do not eat, drink, or smoke while using this product. Wash hands thoroughly after use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	Property	Value
Appearance:	Gray powder or solid	Vapor Density (air = 1):	Not applicable
Odor:	None	Boiling Point (°F):	2870°C (5198°F)
Molecular Weight:	Mixture	Melting point:	1495°C (2723°F)
Physical State:	solid	Specific gravity (g/cc):	9.5 – 15.5
pH:	Not applicable	Viscosity (cps):	Not applicable
Vapor Pressure (mm Hg):	Not applicable	Decomposition Temperature:	Unknown
Solubility in Water (20 °C):	Practically insoluble	Evaporation Rate:	Not Applicable

Property	Value	Property	Value
Volatiles, Percent by volume:	Not applicable	Octanol/water partition coefficient:	Unknown

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressure
 CONDITIONS TO AVOID: Avoid exposure to heat, sparks, or flame.
 MATERIALS TO AVOID: Acids, bases, strong oxidizers.
 HAZARDOUS DECOMPOSITION PRODUCTS: When heated to decomposition, may produce metal oxides and fumes. Inhalation of high concentrations of metal fumes may cause a condition known as "metal fume fever" which is characterized by flu-like symptoms.
 HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

POTENTIAL EXPOSURE ROUTES: This product may be encountered through skin contact, eye contact, ingestion, or inhalation of dusts, fumes or powder.

ACUTE ANIMAL TOXICITY DATA:

For Product: The toxicological properties of this product have not been thoroughly investigated.		For Components:				
		Tungsten Carbide	Titanium Carbide	Tantalum Carbide	Cobalt	Niobium Carbide
Oral LD ₅₀	Believed to be > 2 g/kg	> 2 g/kg (rat)	No data	No data	6.171 g/kg (rat)	> 10 g/kg (rat)
Dermal LD ₅₀	Believed to be > 2 g/kg	> 2 g/kg (rabbit)	No data	No data	No data	No data
Inhalation LC ₅₀	Believed to be harmful if inhaled	> 5 mg/l (4 hour, rat)	No data	No data	No data	No data
Irritation	Irritant	Mild eye and skin irritant	No data	No data	Respiratory irritant, skin and resp. sensitizer	No data

SUBCHRONIC/ CHRONIC TOXICITY DATA: No information for product.
 CARCINOGENICITY: There have been some recent studies of hard metals workers (epidemiology studies) that have reported an association between exposure to hard metals and lung cancer. Because of problems in the designs of these studies, it is not possible to conclusively demonstrate that occupational exposure to hard metal dust causes lung cancer in humans. No long-term studies or cancer studies in laboratory animals exposed to hard metal have been conducted. The International Agency for Research on Cancer (IARC) lists cobalt and cobalt compounds as possibly carcinogenic to humans, group 2B.
 MUTAGENICITY: Studies conducted in test tubes with white blood cells (lymphocytes) from humans that have been exposed to hard metal powder suggest that there may be a specific interaction between tungsten carbide and cobalt that may cause damage to DNA molecules within the cell's nucleus. However, when lymphocytes from workers exposed to hard metal dust were examined, no changes in the DNA were found.
 REPRODUCTIVE, TERATOGENICITY, OR DEVELOPMENTAL EFFECTS: This product is not know or reported to cause reproductive or developmental effects
 NEUROLOGICAL EFFECTS: This product is not known or reported to cause neurological effects.
 INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY: None known or reported.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:	MOBILITY:	PERSISTENCE/DEGRADABILITY:	BIOACCUMULATION:
No data.	No data.	No data.	No data.

13. DISPOSAL CONSIDERATIONS

Responsibility for proper waste disposal is with the owner of the waste.
 This is a valuable material that should be sent to an appropriate reclamation facility if available. If material cannot be sent to a reclamation facility, dispose of all waste product and containers in accordance with local, state, federal, and national regulations.

14. TRANSPORT INFORMATION

DOT/IMO/IATA	Cutting Tool – Not Classifiable or regulated by DOT.
PROPER SHIPPING NAME	Powder Form - May be classifiable or regulated by DOT as a flammable solid or toxic/poisonous substance. If a powder is resold and shipped in the same physical form it was received, appropriate labeling, marking, documenting, and placarding may be needed. Contact Kennametal Corporate EHS Department at (724) 539-5066 for information on powder classification.
HAZARD CLASS	
UN NO.	
PACKING GROUP	
LABEL	
REPORTABLE QUANTITY	None

15. REGULATORY INFORMATION

INVENTORY STATUS

United States (TSCA) All ingredients are on the inventory or are exempt from listing.
 CERCLA: None
 SARA 313: Cobalt
 SARA 312 HAZARD CLASS: Health: Acute – Yes, Chronic - Yes Fire: None Reactivity: None Release of Pressure: None
 SARA 302 EHS LIST: None of the components of this product are listed.
 TPQ = Threshold Planning Quantity; RQ = Reportable Quantity; *No reporting of release is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers.

STATE RIGHT-TO-KNOW STATUS

Component	CA Prop. 65*	Michigan	New Jersey	Pennsylvania	Massachusetts
Cobalt	X	X	X	X	X

* "WARNING: This product contains detectable amounts of a chemical(s) known to the State of California to cause cancer and/or birth defects or other reproductive harm."

Canada DSL List: The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

IDL: Cobalt, Tungsten compounds, n.o.s.

WHMIS: D2B. In the form of a pressed and sintered item, this is a manufactured article and is not a "controlled product" under WHMIS

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*.

16. OTHER INFORMATION

REVISIONS: 12/05/03
 PREPARED BY: Kennametal, Inc.
 NOTICE: This information is intended for industrial use only by our customers. Any use by third parties is at their own risk. This MSDS meets the regulatory requirements and standards for U.S. products. It may not meet the requirements in all other locations. Although Kennametal Inc. has attempted to provide current and accurate information herein, Kennametal Inc. makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

For free powder handling or metallurgical safety booklets write: Kennametal Inc., MSDS Coordinator, P.O. Box 231, Latrobe, PA 15650
 For additional MSDSs or any other information, contact: Kennametal Corporate Compliance Office, phone 724-539-5747 or FAX: 724-539-5439
 For technical information contact: Corporate EHS, phone 724-539-5066 or fax 724-539-5372
 To purchase Kennametal products call: 1-800-446-7738 or visit our website at www.kennametal.com