

K313 Tungsten Carbide

K-0963-003 (10/91)
ISSUE DATE 10/91

DATE PREPARED: 10/85
SUPERCEDES: 10/90

IDENTIFICATION

PRODUCT NAME: K313, K714, KS1, KZ313, KZ714, SP281, SPZ313, SP939
CHEMICAL NAME: Tungsten Carbide product with Cobalt binder
CHEMICAL FAMILY: Refractory Metal Carbide
SYNONYMS: Hard Metal, Cemented WC, Tungsten Carbide
MOLECULAR FORMULA: Mixture

INGREDIENTS

| MATERIAL | C.A.S. NUMBER | % BY WEIGHT | OSHA TLV-TWA (mg/m ³) | ACGIH TLV-TWA (mg/m ³) | NFPA HAZARD RATING SCALE 0-4 | | |
|-------------------|---------------|-------------|-----------------------------------|------------------------------------|------------------------------|------|------------|
| | | | | | HEALTH | FIRE | REACTIVITY |
| Tungsten Carbide | 12070-12-1 | 68.0-95.9 | 5 | 5 | No NFPA Rating | 0 | 0 |
| *Cobalt | 7440-48-4 | 1.0-10.0 | 0.05 | 0.05 | 1 | 3 | 0 |
| Tantalum Carbide | 12070-06-3 | 1.0-5.0 | 5 | 5 | No NFPA Rating | 0 | 0 |
| Titanium Carbide | 12070-08-5 | 1.0-5.0 | 5 | None Established | No NFPA Rating | 0 | 0 |
| Niobium Carbide | 12069-94-2 | 1.0-5.0 | 5 | 5 | No NFPA Rating | 0 | 0 |
| *Chromium Carbide | 12012-35-0 | 0.1-7.0 | 0.5 | 0.5 | No NFPA Rating | 0 | 0 |

* Identifies substances that are subject to the requirements of Section 313 of Title III of Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

PHYSICAL DATA

DESCRIPTION
Gray powder or solid

RELATIVE DENSITY (H₂O = 1)
11 to 15.5

SOLVENT SOLUBILITY
Practically insoluble

BOILING POINT
2870°C (5198°F)

**VAPOR DENSITY (AIR = 1)
AT AMBIENT TEMP.**
Not measurable

**PERCENT VOLATILES
BY VOLUME**
Negligible

MELTING POINT
1495°C (2723°F)

SOLUBILITY IN WATER
Practically insoluble

EVAPORATION RATE
Negligible

EMERGENCY PHONE NUMBERS

Chemtrec 800-424-9300

Kennametal Inc. • P.O. Box 231, Latrobe, PA 15650 • Phone 412-539-5150

FIRE AND EXPLOSION HAZARD DATA

FIRE AND EXPLOSION HAZARDS

Finely divided tungsten carbide 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. Tungsten carbide product, except as powder or dust, is not a fire hazard.

FLASH POINT

Not determinable.

FIRE FIGHTING MEDIA

For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash.

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.

Avoid breathing fumes from burning material.

Firefighting personnel must use proper respiratory protection.

REACTIVITY

STABILITY

Stable under normal temperatures and pressure.

INCOMPATIBILITIES

Tungsten Carbide with:

Chlorine Trifluoride: Reacts with a flame.

Fluorine: Incandescence.

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

Iodine Pentafluoride, Lead Oxide: Violent Reaction.

Cobalt with:

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

Hydrazinium Nitrate: Decomposes explosively upon rapid heating.

Nitryl Fluoride, Acetylene: Reacts incandescently.

DECOMPOSITION

Thermal decomposition may release acrid smoke and irritating fumes.

POLYMERIZATION

Not known to occur.

TOXICITY

WARNING

Overexposure to this material in the form of metallurgical powder, dust or mist from grinding or sweeping is hazardous to health. May cause eye, skin, and mucous membrane irritation. 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.

Carcinogenic status: There is evidence of increased incidence of lung cancer among chromium alloy workers. There is also a suggestion of increased incidence of cancers at other sites. However, the chromium compounds responsible cannot be specified (ARC). None of the remaining components of this material has been identified as a known or suspected carcinogen.

Tungsten Carbide: Toxicity has not been quantified. May cause pulmonary and skin sensitization in dust form.

Cobalt: 1500 mg/kg Oral-rat LDLo; 250 mg/kg Intraperitoneal-rat LDLo; 100 mg/kg Intravenous-rat LDLo; 20 mg/kg Oral-rabbit LDLo; 100 mg/kg Intravenous-rabbit LDLo.

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.

Chromium, Tantalum Carbide, titanium Carbide, Niobium Carbide: May cause mucous membrane irritation.

Iron: Considered to be non-toxic orally. Physiologically inert. May cause eye and mucous membrane irritation.

ROUTES OF EXPOSURE/HEALTH EFFECTS AND FIRST AID*

*Health effects listed are for exposure to metallurgical powders, dust, or mist from grinding. No health effects have been reported for exposure to this material in solid form.

INHALATION

Irritant/Sensitizer: Inhalation in the form of metallurgical powder, dust or mist from grinding may cause irritation of the nose and throat. 20 mg (Co)/m³ is immediately dangerous to life and health.

● ACUTE OVEREXPOSURE

Tungsten Carbide: May cause coughing, dyspnea, soreness in the chest, weight loss, hemoptysis, bronchitis, and asthma. Also cause pulmonary fibrosis. Radiological changes may be noted in the lungs.

Cobalt: May cause shortness of breath, asthma, dyspnea on exertion, wheezing, interstitial pneumonitis, and/or lung densities.

Tantalum Carbide: None reported in humans.

Titanium Carbide: May be considered a nuisance dust and may result in dust accumulation in the lungs.

Niobium Carbide: May cause respiratory irritation.

Chromium Carbide: May cause irritation and pulmonary edema after exposure to high concentrations.

● CHRONIC OVEREXPOSURE

Tungsten Carbide: May cause "hard metal lung" with symptoms as described in acute overexposure. Previously exposed individuals may be at increased risk.

Cobalt: May cause pneumoconiosis sensitization of the respiratory tract, obstructed airways syndrome, interstitial lung disease, and density of the lung with symptoms as described in acute exposure.

Tantalum Carbide: None reported in humans. Has been demonstrated to be physiologically inert in animals.

Titanium Carbide: May cause fibrosis or pneumoconiosis.

Niobium Carbide: None reported in humans.

Chromium Carbide: Histologic fibrosis of the lungs may occur, progressing to pneumoconiosis.

● FIRST AID

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

Irritant/Sensitizer: In the form of metallurgical powder, dust or mist from grinding.

● ACUTE OVEREXPOSURE

Tungsten Carbide: May cause irritation with dermatitis, eczema, and itching. May also cause sensitization dermatitis if previously exposed.

Cobalt: Sensitization dermatitis may occur in persons who are previously exposed. A rash may develop, usually in the flexor creases of the elbow, neck and face.

Tantalum Carbide, Titanium Carbide, Niobium Carbide, Chromium Carbide: None reported in humans.

● CHRONIC OVEREXPOSURE

Tungsten Carbide: May cause contact dermatitis.

Cobalt: May cause contact dermatitis. Sensitization dermatitis may follow inhalation or prolonged contact.

Tantalum Carbide, Titanium Carbide, Niobium Carbide, Chromium Carbide: None reported in humans.

● FIRST AID

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

Irritant.

● ACUTE OVEREXPOSURE

Tungsten Carbide, Cobalt: May cause irritation with redness, pain and itching.

Tantalum Carbide, Titanium Carbide, Niobium Carbide, Chromium Carbide: May cause irritation.

● CHRONIC OVEREXPOSURE

Tungsten Carbide, Cobalt: May cause conjunctivitis.

● FIRST AID

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

Irritant: In the form of metallurgical powder, dust, or mist from grinding.

● ACUTE OVEREXPOSURE

Tungsten Carbide: May cause gastrointestinal irritation. Large doses may cause diarrhea.

Cobalt: May cause hypotension, pain, vomiting, and sensations of hotness or nausea. Severe exposure may cause pericardial effusion, convulsions, or enlargement of the thyroid.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: Systemic poisoning not known to occur.

Chromium Carbide: The toxicity of chromium compounds depends upon the valence state of the metal. Chromium carbide is not absorbed.

● CHRONIC OVEREXPOSURE

Tungsten Carbide: None reported in humans.

Cobalt: May adversely affect the pancreas, thyroid gland, heart, or bone marrow.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: None reported in humans.

● FIRST AID

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.

SPILL AND LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Sweep up with a minimum of dust generation and place in suitable clean, dry containers for reclamation or later disposal. Residue should be cleaned up using a high-efficiency particulate filter vacuum or wet clean up. Use appropriate respiratory protection.

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, state and local environmental regulations.

CONTROL MEASURES AND PROTECTIVE EQUIPMENT

VENTILATION

Provide local exhaust ventilation or general dilution ventilation to maintain exposure levels below TLV-TWA.

RESPIRATORY PROTECTION

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 a high-efficiency filter with a full facepiece. Type "C" supplied-air respirator with a full facepiece operated in 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 using or reprocessing these materials.

SPECIAL PRECAUTIONS

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, dry, cool area.

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 medical examinations are recommended for individuals regularly exposed to dust or mist.

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For free powder handling or metalcutting safety booklets write: **Kennametal Inc., Attn: Safety Coordinator, P.O. Box 231, Latrobe, PA 15650.**
For additional information contact Health, Safety and Environmental Affairs Manager, **Telephone: 412-539-5157, FAX: 412-539-5372.**

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