



MIDWEST INDUSTRIAL TOOL GRINDING, INC.

45 W. Highland Park Drive NE
Hutchinson, MN 55350
320-455-0535 – Phone
320-455- 0805 – Fax
www.mitgi.us

A letter to our valued customers,

We are pleased to have you as a customer of MITGI. We want to ensure that you have most current safety information about our products available to you and for your use. The information following this cover letter is our most recent revision of our Safety Data Sheet (SDS) for the solid carbide cutting tools we manufacture. It is designed to comply with the Occupation Safety and Health Administration Hazard Communication Standard 29 CFR 1910.1200. The SDS has been compiled from information supplied to us by our current vendors for the carbide grades that we currently stock and use for production of our products. Information about special application grades is available upon request.

We at MITGI strongly encourage our customers to carefully review the information provided in the SDS in its entirety. This includes Section 16: Other Information which includes information regarding User Responsibilities and Disclaimer Limitations.

Please contact us if you have any questions concerning the safe use of our products.

Kind Regards,

Safety Committee
MITGI



MIDWEST INDUSTRIAL TOOL GRINDING, INC.

Date: May 19, 2019

Safety Data Sheet: Solid Carbide Cutting Tools
Solid Carbide Blanks
Carbide Solid & Carbide Brazed

SECTION 1: IDENTIFICATION OF PRODUCT AND COMPANY

Product Identifier/Trade Name: Cemented Tungsten Carbide, Coated Cemented Carbide, Cobalt, Nickel-Cobalt, or Nickel-Cobalt-Chromium Binder, Tantalum, Titanium, Niobium and Vanadium Carbide

Synonyms: Carbide, Tungsten Carbide, Cemented Carbide, Sintered Carbide, Hardmetal, Carbide Pre-Forms

Chemical Family: Refractory Metal Carbide

Identified Uses: Production of carbide is used to produce carbide cutting tools/manufacturing

Restrictions for Product Use: Cutting, sharpening or grinding of hard-metal tools may produce dusts of hazardous substances. These may be inhaled, ingested or come into contact with the skin if proper exposure controls (ventilation, dust/mist collection, personal protection equipment) are not used.

Appearance: Dark grey metallic solid product

Uses Advised Against: N/A

Supplier of SDS:

Midwest Industrial Tool Grinding, Inc.
45 W. Highland Park Drive NE
Hutchinson, MN 55350
(320) 455-0535 – Phone / (320) 455-0805 – Fax
Emergency Phone – (320) 455-9746 (*not staffed 24/7*)

www.mitgi.us

SECTION 2: HAZARD IDENTIFICATION

OSHA Regulatory Status: Chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard – 29 CFR 1910.1200

Physical Hazards	Category
Substances/Mixtures, when in contact with water, can emit flammable gases	1

Health Hazards	Category
Respiratory	1, 2
Skin	1
Eye Irritant	2A, 2B
Reproductive Toxicity	2
Carcinogenicity	1A, 1B, 2
Combustible Dust	N/A
STOT (Specific Target Organ Toxicity) Single Exp.	1 (Respiratory, Kidney) / 3 (Respiratory, Irritation)
STOT (Specific Target Organ Toxicity) Repeated Exposure	1 (Respiratory)
Acute Toxicity	1, 2
Aquatic Acute	1
Aquatic Chronic	1, 2

Environmental Hazards	Category
Long-term Aquatic Hazard	4

Labeling Elements

Hazard Pictograms



DANGER: The intended use(s) of the product(s) may include: cutting, grinding, brazing, welding and other miscellaneous industrial operations that could burn or alter the solid structure of the product(s) as provided; can release hazardous metallic particles in the form of: powders, dust, mist, vapors or fumes and may be flammable. The hazards listed are applicable to the industrial machining and processing operations of these products. Handling of the the product(s) may cause skin irritation.

NOTE: A PBT -/vPvB Assessment is not required.

Signal Word	Dangers
Hazard Statements	<p>May cause an allergic skin reaction.</p> <p>If inhaled, may cause allergy and/or asthma. symptoms and breathing difficulties.</p> <p>May cause cancer.</p> <p>May cause eye irritation.</p> <p>May cause damage to organs (lungs/respiratory) through prolonged and repeated exposure.</p> <p>May cause an allergic skin reaction.</p> <p>May be fatal if inhaled.</p> <p>May be harmful if swallowed.</p> <p>May cause damaging of fertility.</p> <p>Very toxic to aquatic life.</p> <p>Flammable solid.</p>
Precautionary Statements: Prevention	<p>Obtain special handling instructions before use.</p> <p>Do not handle until all safety precautions have been read, reviewed and understood.</p> <p>Use personal protective equipment if required.</p> <p>In case of inadequate ventilation where material is being handled, wear respiratory protection.</p> <p>Do not breathe in dust, fumes, gas, mist, vapors, or spray.</p> <p>Wear protective gloves.</p> <p>Avoid release into the environment.</p> <p>Wash any exposed skin and hands thoroughly after handling.</p> <p>Do not eat, drink or smoke when in contact with this product.</p>
Response Statements: Response	<p>Get medical attention and/or advice if exposed or concerned about the product.</p> <p>If on Skin: Wash with soap and water. If skin irritation begins, get medical attention/advice. If on clothing, wash before wearing again.</p> <p>If Inhaled: If breathing becomes difficult, remove the victim to fresh air. If respiratory symptoms occur, call a poison control system and/or doctor.</p>

Storage & Disposal	<p>Store in well ventilated area. Keep container(s) tightly closed.</p> <p>Dispose of contents to secure container in accordance with local, regional and/or international regulations. Product should be recycled as directed.</p>
Potential Effects of Exposure	<p>Inhalation: May cause irritation of the respiratory organs for a small percentage of people. These may include: occupational asthma and interstitial fibrosis. Reports have shown that individuals that have been exposed to airborne cemented carbide dust, have a higher risk of contracting lung cancer.</p> <p>Skin Contact: May cause irritation or an allergic skin rash due to either cobalt and/or nickel sensitization.</p> <p>Eye Contact: May cause irritation.</p> <p>Ingestion: Reporting has found that ingestion of significant amounts of cobalt has the potential to cause blood, heart and other organ problems.</p>

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	CHEMICAL SYMBOL/FORMULA	CAS NO.	EIN/ECS NO.	WEIGHT %
Tungsten Carbide	WC	12070-12-1	235-123-0	40-98%
Cobalt	Co	7440-48-4	231-158-0	0-30%
Nickel	Ni	7440-02-0	231-111-4	0-25%
Tantalum Carbide	TaCx	12070-06-3	235-118-3	0-25%
Niobium Carbide	NbC	12069-94-2	235-117-8	0-20%
Titanium Carbide	TiC	12070-08-5	235-120-4	0-52%
Chromium	Cr	7440-47-3	231-157-5	0-10%
Arsenic	As	7440-38-2	231-148-6	0-10%
Aluminum	Al	7429-90-5	231-072-3	0-10%
Nitrogen	N	7727-37-9	231-783-9	0-10%
Tin	Sn	7440-31-5	231-141-8	0-10%
Molybdenum	Mo	7439-98-7	231-107-2	0-9.8%
Tungsten	W	7440-33-7	231-143-9	0-6.8%
Titanium Nitride	TiN	25583-20-4	247-117-5	0-5%
Chromium Carbide	Cr ₃ C ₂	12012-35-0	234-576-1	0-5%
Vanadium Carbide	VC	12070-10-9	235-122-5	0-5%
Zirconium Carbide	ZrC	12070-14-3	235-125-1	0-5%
Sulfur	S	7704-34-9	231-772-6	0-2.5%
Carbon	C	7440-44-0	231-153-3	0-2.5%
Vanadium	V	1314-62-1	231-171-1	0-2.1%

SECTION 4: FIRST-AID MEASURES

Eye Contact	If eye irritation begins, flush with water for up to 10-15 minutes. Remove contact lenses if worn. If irritation persists, seek immediate medical attention.
Skin Contact	If irritation or rash of skin begins, thoroughly wash the affected area with soap and water; isolate from exposure. Remove contaminated clothing and/or shoes and wash before reuse. If the irritation or rash persists, seek immediate medical attention.
Inhalation	If lung irritation begins (which includes coughing, wheezing, difficulty in breathing, etc.), remove from exposed area to fresh air. If inhalation irritation persists, seek immediate medical attention. If breathing has stopped, perform resuscitation using universal CPR procedures.
Ingestion	If a substantial quantity is swallowed, dilute & rinse with a large amount of water; induce vomiting if needed. Drink plenty of water. Seek medical attention.
General Advice	After first aid measures have been taken, seek the appropriate medical attention. <i>Note: Symptoms of poisoning may even occur after several hours; therefore medical observation is recommended for at least 48 hours after the incident.</i>

Most Important Symptoms and Effects (both acute and delayed): General contact with metal powders may cause irritation to the skin, eyes and respiratory tract. If inhaled, the powder or dust may cause weak respiratory tract irritation. Chronic inhalation or ingestion has the potential to cause permanent disease or death; and should be avoided. If person exhibits skin allergies, the individual may have a sensitivity to metals and should consult physician and limit exposure.

SECTION 5: FIRE-FIGHTING MEASURES

Flash Point: Not applicable

Lower Explosive Limit: Not Applicable

Upper Explosive Limit: Not Applicable

Extinguishing Media

- During normal use and operation, sintered tools (*hard-metal articles*)/cemented carbide products do not present a fire hazard. However, dusts generated from and/or during machining operations may ignite if allowed to accumulate when exposed to an ignition source.
- For powder fires, smother with dry sand, dry dolomite, ABC (general, oil, electric fire) fire extinguisher, and/or flood with water. Avoid use of water if water reactive metal powder may be nearby.



Specific Hazards Arising From the Article Use

- Hard metal (cemented) particles generally do not present a fire hazard. However, under rare specific conditions where dust particles have accumulated, dispersion and/or particles mixed with oils in a mist form are exposed to high temperatures or ignition sources – fire and explosion may occur. When heated to decomposition, the conditions may be favorable to metal oxides and/or fumes. In other terms, dust that is generated in the grinding operations may ignite if allowed to accumulate and subjected to an ignition source.
- May generate toxic metal fumes when heated.

Hazardous Combustion Products

- Oxides of cobalt and tungsten, carbon dioxide and carbon monoxide

Protective Equipment & Precautions for Firefighters

- In the case of a powder/dust fire that is confined to a small area, use a respirator approved for toxic dusts and fumes. If, a larger fire, fire fighters should use a self-contained breathing apparatus. In both scenarios, a protective suit must be worn.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Cemented carbide products don't present hazards that require accidental measures. The grinding of cemented carbide products (wet or dry) may produce hazardous dust. In the event airborne dust is generated; avoid inhaling, swallowing or allowing dust to come in contact with skin and eyes. Use proper safety & personal protection equipment to avoid dust/mist exposure. Such safety equipment includes: eye protection, safety gloves and appropriate dust respirator if needed. Wash hands thoroughly after handling. Ventilate area if necessary.

Environmental Precautions

In the event of dust and/or mist particles, contain and recycle contents according to regulations to avoid release into the environment. Utilization of a vacuum with a filter that prevents resuspension of dust, should be utilized for cleanup of dust particles. Wet cleanup should be used when necessary. Particles to be recycled should be kept in closed storage containers.

Methods and Materials for Containment and Cleanup

Dust, mist and fragments from cemented carbide articles should be captured and recycled. Prevent further leakage or spillage if safe to do so. Place materials in properly labeled containers and keep closed.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Cemented carbide materials as delivered do not present hazards that require safe handling. Although cemented carbide is a stable substance and has little effect on health, it may cause rough skin when used repeatedly. Use the above precautions for safe handling practices.

Wash hands thoroughly after handling material; as well as before eating, drinking or smoking. Do not eat or drink while handling material. Wash exposed skin at the end of work shift. Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or vacuuming (*with appropriate vacuum filters*) the clothing, rags or other items. Ensure adequate ventilation and protective equipment is used when necessary.

Incompatible Materials: Contact of dust with strong oxidizers may cause fire or explosions. Avoid contact with strong acids.

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

Conditions for Safe Storage, Including Any Incompatibles

Storage Conditions: Keep storage containers closed when not in use. Store in cool dry conditions.

Incompatible Materials: Contact of dust with strong oxidizers may cause fire or explosions. Avoid contact with strong acids.

Other Precautions

Cemented carbide product is very dense, so ensure that safe lifting practices, equipment and protective equipment are being used when applicable to limit potential muscular/skeletal injury. When in certain tooled designs; edges may be extremely sharp. Handle with gloves when necessary. During certain machining operations; tools can fragment or evacuate chips from the metal removal process which can be extremely dangerous. Appropriate machine guards and eye protection should be used.

Specific End Uses

Cemented carbide products are used as tools in machining and wear parts.

SECTION 8: EXPOSURE CONTROLS – PERSONAL PROTECTION

Control Parameters

Cemented carbide in sintered (hard-metal) form does not present any known exposure risk. When grinding, particles can become airborne in either a dust and/or mist form, which can then come in contact with the skin/eyes or inhaled/ingested. Precautions to prevent these types of exposures should be practiced.

Exposure Guidelines

CHEMICAL NAME	CAS #	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aluminum	7429-90-5	TLV TWA: 1 mg/m ³	TWA PEL: 15 mg/m ³	TWA REL: 5-10 mg/m ³
Arsenic	7440-38-2	TLV TWA: 0.01 mg/m ³	TWA PEL: 0.01-0.5 mg/m ³	TWA REL: 0.002 mg/m ³
Carbon	7440-44-0	Not Available	Not Available	Not Available
Cemented Tungsten Carbide	11107-01-0 12718-69-3	Not Available	TWA PEL: 0.1 mg Co/m ³	TWA REL: 0.05 mg Co/m ³
Chromium/ Chromium Carbide	12012-35-0 (as: 7440-47-3)	TLV TWA: 0.5 mg/m ³ (<i>inhalable particle matter</i>)	TWA PEL: 1.0 mg/m ³ CAL/OSHA TWA: 0.5 mg/m ³	TWA REL: 0.5 mg/m ³ IDLH PPM: 250 mg/m ³
Cobalt	7440-48-4	TWA REL: 0.02g/m ³	TWA PEL: 0.05-0.1 mg/m ³ CAL/OSHA TWA: 0.020 mg/m ³	TWA REL: 0.05 mg/m ³ IDLH PPM: 20 mg/m ³
Molybdenum	7439-98-7	TWA: 10 mg/m ³	TWA: 10 mg/m ³	IDLH: 5000 mg/m ³
Nickel	7440-02-0	(<i>as elemented particles</i>) TWA: 1.5 mg/m ³	TWA PEL: 1 mg/m ³ CAL/OSHA TWA: 0.5 mg/m ³ (<i>as metal</i>)	TWA REL: 0.015 mg/m ³ IDLH PPM: 10 mg/m ³
Niobium Carbide	12069-94-2	Not Available	Not Available	Not Available
Nitrogen	7727-37-9	Not Available	Not Available	Not Available
Sulfur	7704-34-9	Not Available	Not Available	Not Available
Tantalum Carbide	12070-06-3	TWA REL: 0.5 mg/m ³	TWA PEL: 0.5 mg/m ³	Not Available
Tin	7440-31-5	TLV TWA: 2 mg/m ³	TWA PEL: 2 mg/m ³	TWA REL: 2 mg/m ³
Titanium Carbide	12070-08-05	TWA REL: 10.0 mg/m ³	TWA PEL: 15.0 mg/m ³	Not Available
Titanium Nitride	25583-20-4	Not Available	Not Available	Not Available
Tungsten Carbide Tungsten	12070-12-1 7440-33-7	(<i>Insoluble as W</i>) TWA REL: 5 mg/m ³ STEL: 10 mg/m ³	(<i>Insoluble as W</i>) CAL/OSHA TWA: 5 mg/m ³ STEL: 10 mg/m ³	(<i>Insoluble as W</i>) TWA REL: 5-10 mg/m ³ STEL: 10 mg/m ³
Vanadium Carbide Vanadium	12070-10-9 1314-62-1	(<i>As dust 12604-58-9</i>) REL: 1 mg/m ³ STEL: 3mg/m ³ TLV TWA: 0.05 mg/m ³	(<i>As dust 12604-58-9</i>) TWA PEL: 0.05-1 mg/m ³ CAL/OSHA STEL: 3 mg/m ³	(<i>As dust 12604-58-9</i>) TWA: 1 mg/m ³ STEL: 3 mg/m ³ IDLH PPM: 500 mg/m ³
Zirconium Carbide	12070-14-3	TLV TWA: 5 mg/m ³	TWA PEL: 5 mg/m ³	Not Available

**Key Terms:**

TLV: Threshold Limit Value / PEL: Permissible Exposure Limit / REL: / OSHA: Occupational Safety & Health Administration US Dept. / ACGIH: American Conference of Governmental Industrial Hygienists, Inc. / NIOSH: US National Institute for Occupational Safety and Health

Appropriate Engineering Controls**Ventilation**

Local ventilation should be used to minimize exposure of dust, mist or fumes that are generated as a result of dry or wet grinding. If ventilation is not available, use respirators as listed below.

Eyewash & Hand Wash Stations

Eyewash and hand washing stations should be located nearby if needed.

Personal Protection Measures**Eye and Face Protection**

Safety glasses with side shields and/or goggles are recommended for grinding or manufacturing of cemented carbide.

Skin and Body Protection

Protective gloves and clothing should be worn, as appropriate, to prevent contact of dust or mist. Wash hands and skin thoroughly after contact with carbide, especially before eating or drinking. Product or evacuating chips may be sharp, consider impervious gloves and other protective clothing such as aprons to prevent and/or minimize skin contact with product. When heat is a factor, consider thermal gloves.

Respiratory Protection

In the case of dust or mist generation, use a half-face or full-face respirator equipped with high efficiency particulate (HEPA) filter cartridges. Use the appropriate, NIOSH approved respirator if airborne dust concentrations exceed applicable exposure limits. For proper selection of respirators, see also American National Standard Practices for Respiratory Protection Z88.2-1969. P-Series particulate respirators should be considered for particulates that may contain oil. Dust or carbide powder can cause respiratory system damage if not protected with an approved respirator and/or other proper engineering controls.

General Protective and Hygienic Measures

Keep away from food and beverage. Wash hands before breaks and at the end of work.

Property	Value
Appearance	Dark Grey Metal
Odor	Odorless
Odor Threshold	N/A
Physical State	Solid
pH	N/A
Softening/Melting/Freezing Point	1495 deg. C – Co 2870 deg. C – WC 2927 deg. C – VC 1455 deg. C – Ni 1907 deg. C – Cr 1910 deg. C - V 3160 deg. C – TiC 3532 deg. C - ZrC 3490 deg. C – NbC 2623 deg. C - Mo 3880 deg. C – TaCx 3422 deg. C - W 817 deg. C – As 2930 deg. C - TiN 660.3 deg. C – Al 1895 deg. C – Cr3C2 231.9 deg. C – Sn 2810 deg. C - VC
Boiling Point	2870 deg. C – (5198 deg. F) – Co 6000 deg. C – WC 2730 deg. C – Ni 4780 deg. C – TaCx 3800 deg. C – Cr 5555 deg. C - W 4820 deg. C – TiC 3800 deg. C – Cr3C2 4300 deg. C – NbC 3900 deg. C - VC
Flash Point	N/A
Gravity	12.0 -15.5 g/cc (mixture)
Evaporation Rate	N/A
Flammability – (Solid, Gas)	Not flammable
Flammability – (Limit in Air)	Not relevant as the substances are not flammable
Vapor Pressure	N/A
Vapor Density	N/A
Relative Density	N/A
Specific Gravity	10.0 to 15.7
Water Solubility	Relatively Insoluble The water solubility of Co at 20 deg. C = 2.94 mg/L
Solubility in Other Solvents	N/A
Partition Coefficient	N/A
Danger of Explosion	Product does not present an explosion hazard
Auto-ignition Temperature	Product is not self-igniting
Decomposition Temperature	>Melting Point - (WC: >2600 deg. C) (Co: >1494 deg. C)
Kinematic Viscosity	Not relevant to its physical form
Dynamic Viscosity	Not relevant to its physical form
Explosive Properties	Not explosive
Oxidizing Properties	Not Oxidizing
Density	12.0 g/cc – 15.7 g/cc (mixture)
Bulk Density	Not Available

Please Note: Chemicals/Materials listed in Section 3 that are not listed above are not applicable in this Section.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Can produce hazardous gases when in contact with strong acids; otherwise cemented carbide products are not reactive.

Chemical Stability: Stable under recommended storage conditions of temperature and pressure; and in its solid form. When in its stable form – it is not explosive, flammable, combustible, pyrophoric and/or oxidizing.

Possibility of Hazardous Reactions: None under normal processing. If in a powder or granular form, there is a possibility of dust explosion mixed with air.

Conditions to Avoid: Contact with incompatible materials and accumulation of dust. Avoid eye and skin contact; and respiration. May cause fire or explosions. Avoid contact with strong acids.

Hazardous Decomposition Products: When heated to decomposition hazardous metal oxides and fumes could be produced.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Routes of Entry Include: Inhalation, Ingestion, Skin and Eye Contact

Cemented carbide in hard-metal (sintered) form does not present any known exposure risk. When grinding the material, particulates can become airborne in a dust/mist form – which may come in contact with the skin/eyes or be inhaled/ingested. Precautions to prevent these listed types of contact, should be practiced.

- **Inhalation** – Dust from grinding can cause irritation of the nose/throat. In some cases, it also has the potential for causing permanent respiratory or pulmonary disease; including occupational asthma, pulmonary fibrosis and interstitial pneumonitis. Symptoms may include coughing, wheezing, shortness of breath, chest tightness, weight loss, minor radiological abnormalities, and the development of hypersensitivity asthma in some people. Respiratory or pulmonary disease is progressive and can lead to permanent disability or death. It is reported that workers that have been exposed to air-borne cemented carbide dust have a higher risk of contracting lung cancer.
- **Eye Contact** – May cause irritation.
- **Skin Contact** – May cause irritation or an allergic skin rash due to cobalt or nickel sensitization. Certain skin conditions, such as dry skin, may be aggravated by exposure.
- **Ingestion** – Reports outside the industry suggest that ingestion of significant amounts of cobalt has the potential for causing blood, heart and other organ problems. Current scientific information indicates no adverse effects are likely from ingestion of small amounts of nickel dust generated from these products.

Symptoms Related to the Physical, Chemical and Toxicological Characteristics

- Cobalt in tungsten carbide has been identified by the IARC (International Agency for Research on Cancer) as a Group 2A Carcinogen (*probably carcinogenic to humans*). Cobalt when inhaled is presumed to be potentially carcinogenic to humans, largely based on animal evidence.
- Symptoms to exposure to dust/mist include unproductive coughing, wheezing, shortness of breath, chest tightness and weight loss.



Delayed, Immediate and Chronic Effects from Short and Long Term Exposure

Immediate effects from Short-Term Exposure: None known

Effects of Overexposure:

Acute: Short term overexposure to the dust, fumes and/or oxides of certain components of steel products may cause irritation of the eyes, nose or throat that may result in 'metal fume fever' which is characterized by a metallic or sweet taste, dryness and irritation of the throat, wheezing, fever and chills, chest tightness, cough and discoloration of the tongue and flu-like symptoms. Typically lasts for a day or two.

Chronic: Excessive and prolonged overexposure to the dust fumes and/or oxides of certain components of steel products may result in chronic interstitial pneumonitis, discoloration of the skin and hair, allergic bronchitis, neoplasms or loss of coordination and balance. It may also affect the heart, pancreas, thyroid gland, or bone marrow. Chronic inhalation has the potential for causing transient or permanent respiratory disease, including occupational asthma.

Other Effects of Exposure:

- Certain pulmonary conditions may be aggravated by exposure
- Skin and eye irritation may be a symptom of exposure
- **Sensitization:** No information available
- **Reproductive Toxicity:** No information available for humans. Reproductive levels have been noted in tested animals, showing no significant effects on reproductive/developmental parameters.
- **STOT – single exposure:** Can cause respiratory, kidney, systemic toxicity, tremors and/or airway issues.
- **STOT – repeated exposure:** Can cause damage to the lung, kidneys and the liver through prolonged or repeated exposure. Can also cause acute inflammatory reactions. May cause allergic reactions to eyes, skin and lungs.

STOT = Specific Target Organ Toxicity

- **Aspiration Hazard:** Not relevant

Unknown Acute Toxicity: \geq 40-50% of the mixture consists of ingredient(s) of unknown toxicity

Germ Cell Mutagenicity: The single components of the mixture, tungsten carbide and cobalt, are not mutagenic.

Carcinogenicity: See information below

Chemical Name	IARC Rating
Cobalt	2A/2B
Tungsten Carbide	2A
Chromium	3
Nickel	1/2B
Arsenic	1

Note: Cobalt and Nickel are known to the state of California to cause cancer. (Proposition 65)

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: Cemented carbide articles (sintered) do not present an ecological/environmental hazard. More than 50% of the mixture consists of component(s) of unknown hazards to the aquatic environment and may be toxic to fish.

Persistence and Degradability: Not applicable.

Bioaccumulative Potential: Bioaccumulation/bioconcentration is not expected for tungsten carbide, neither for aquatic species nor for species living in sediments. The bioavailability of tungsten from tungsten compounds is expected to be at low concentrations in the water column due to stream and river sediment adsorption and low potential for leaching from soils.

Based on BCFs calculated from paired concentrations of tungsten in soil and worm, or soil and plant tissue, tungsten carbide exposures are not expected to result in the bioaccumulation of tungsten in soil/soil organisms.

Cobalt has low potential for bioaccumulation based on the following bioconcentration factors (BCF) and bioaccumulation factors (BCA):

Aquatic Plants: BCF > 100-5000

Aquatic Invertebrates: BCF < 300

Fresh Water, Fish: BCF/BAF < 10

Marine, Fish: BCF/BAF < 10

Mobility in the Soil: Although there is mobility in the floating dust, it is easily deposited as the specific gravity is high. The adsorption/desorption is highly dependent on the characteristics of the soil system in question.

For the mixture of cobalt and tungsten carbide, there is no information available about the behavior in the environment. However, data for Sodiumtungstenate or Tungsten metal is available and it is to be expected that these describe the mobility of Tungstentrioxide in the environment adequately. The absorption and desorption is highly dependent on the characteristics of the soil tested system. For example, take the soil-absorption-coefficient for Tungsten metal and Sodiumtungstenate increase with decreasing pH. In addition, it can last up to about 3-4 months for setting the equilibrium between soil and Tungsten in the system. The soil-absorption-coefficient measured for Sodiumtungstenate differs in a range from 16.6 to 863 l/kg. In addition, the mobility of cobalt in soil is insignificant due to the low water solubility of this metal.

Results of PBT and vPvB Assessment: Tungsten carbide and cobalt are inorganic substances, and therefore the PBT and vPvB assessment is not required. None known.

General Notes: Do not allow product to reach ground water, water course or sewage system, even in small quantities. Danger to drinking water if leaked into the ground. Toxic for aquatic organisms.

Other Adverse Effects: None known.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Treatment Methods:

Disposal of Wastes: Owners are encouraged to recycle cemented carbide articles. These are valuable articles and should be sent to the appropriate recycling facility and/or manufacturer. Re-use if able to. If the articles cannot be sent to the proper recycling facility, dispose of all waste products in accordance with local, state/provincial, federal and national regulations. MITGI discourages disposal of cemented carbide articles through sewage disposal. Wastewater should be processed through a sewage treatment plant (STP) either on-site or off-site.

Contaminated Packaging: Do not reuse container. Dispose of in accordance with all federal, state or local laws or regulations regarding disposal.

Chemical Name	California Hazardous Waste Status
Chromium – 7440-47-3	Toxic, Corrosive, Intangible
Chromium Carbide – 12012-35-0	Toxic, Corrosive, Intangible
Cobalt – 7440-48-4	Toxic Powder, Ignitable Powder Toxic
Molybdenum – 7439-98-7	Ignitable Powder
Nickel – 7440-02-0	Toxic Powder, Ignitable Powder

SECTION 14: TRANSPORT INFORMATION

Cemented carbide articles are not classified or regulated. As a solid and as sold, cemented tungsten carbide product blanks are not dangerous goods. Product is an article not applicable or regulated by US-DOT per 49 CFR 171-180. In the USA and certain other countries, hardmetal powder, waste and by-products of hardmetal in dispersive form, when shipped by road or by air in non-bulk packages, are not considered Hazardous Material (dangerous goods) for transportation purposes when shipped domestically.

DOT: Not regulated as sold

IATA: Not regulated as sold

IMDG: Not regulated as sold

RID: Not regulated as sold

As sold, solid hardmetal blanks are not dangerous goods. The transport classification below applies to hardmetal only:

UN-No.	UN3077
UN Proper Shipping Name	Environmentally hazardous substance, solid, contains cobalt
Transport Hazard Class	9
Packing Group	III
Environmental Hazard	Marine Pollutant

Domestic shipments of this product and by products by water or shipments of bulk packages are considered Hazardous Materials (dangerous goods) and the transportation requirements listed above are applicable. They are applicable to all international shipments of hardmetal powder, waste and by-products of hardmetal in dispersive form. Please consult the applicable transportation regulations of the country you are located in.

SECTION 15: REGULATORY INFORMATION

Inventory Status

US Toxic Substances Control Act Inventory (TSCA): All ingredients are on the inventory or exempt from listing

Canada Domestic Substances List (DSL/NDSL): All ingredients are on the inventory or exempt from listing

European Inventory of Existing Chemical Substances (EINECS): All ingredients are on the inventory or exempt from listing

Japan Existing & New Chemical Substances (ENCS): Not evaluated

China Inventory of Existing Chemical Substances (IECSC): Not evaluated

Korean Existing and Evaluated Chemical Substances (KECL): All ingredients are on the inventory or exempt from listing

Philippines Inventory of Chemicals and Chemical Substance (PICCS): Not evaluated

Australian Inventory of Chemical Substances (AICS): Not evaluated

Occupational Safety and Health Act (OSHA): Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

USA Federal Regulations

SARA 313 (Superfund Amendments & Reauthorization Act)

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

US EPA Label Information

EPA Pesticide Registration Number – *Not applicable*

Chemical Name	SARA 313 – Threshold Values %
Chromium – 7440-47-3	1.0
Cobalt – 7440-48-4	0.1
Nickel – 7440-02-0	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No



CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA – Reportable Quantities	CWA – Toxic Pollutants	CWA – Priority Pollutants	CWA – Hazardous Substances
Chromium 7440-47-3	-	X	X	-
Chromium Carbide 12012-35-0	-	X	-	-
Nickel 7440-02-0	-	X	X	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Chromium 7440-47-3	5000 lb. – 10 lb.	-	RQ 5000 lb. final RQ RQ 2270 kg final RQ RQ 10 lb. final RQ RQ 4.54 kg final RQ
Nickel 7440-02-0	100 lb.	-	RQ 100 lb. final RQ RQ 45.4 kg final RQ

US State Regulations

California Proposition 65

This product contains the following Proposition 65 Chemicals:

Chemical Name	California Proposition 65
Cobalt – 7440-48-4	Carcinogen – Cancer causing product
Nickel – 7440-02-0	Carcinogen – Cancer/Birth Defect causing product

US State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Chromium 7440-47-3	X	X	X
Chromium Carbide 12012-35-0	X	-	X
Cobalt 7440-48-4	X	X	X
Molybdenum 7439-98-7	X	X	X
Nickel 7440-02-0	X	X	X
Tungsten Carbide 12070-12-1	X	-	-
Vanadium Carbide 12070-10-9	X	-	X
Titanium Carbide 12070-08-05	X	-	X

Canada Regulations

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR. As sold, product is a manufactured article and classification or labeling is not required.



WHMIS Hazard Class – D2A Very Toxic Materials

Non-controlled

Chemical Name	NPRI
Cobalt – 7440-48-4	X
Nickel – 7440-02-0	X

EU Regulations

EU Legislation: Regulation (EC) 1907/2006 (REACH)

Chemical Safety Assessment: A chemical safety report has been prepared for Tungsten Carbide and Cobalt. According to the requirements from the guide 'European Chemicals Agency Guidance on the compilation of Safety Data Sheets' – (October 2010), are in no exposure scenarios added to the SDS. An exposure scenario is only necessary if materials of the criteria for the listed hazard classes in Article 14 (4) of the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, as provided in Article 58 of the revised Regulation on classification, labeling and packaging (CLP) meeting.

The product(s) listed on this SDS is in compliance with Directive 2011/65/EU of European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS). The product does not contain the following substances in concentrations greater than the maximum value listed after the substance:

- Lead (Pb): 1,000 ppm
- Cadmium (Cd): 100 ppm
- Mercury (Hg): 1,000 ppm
- Hexavalent Chromium (Cr6+): 1,000 ppm
- Poly Brominated Biphenyls (PBB): 1,000 ppm
- Poly Brominated Diphenyl (PBDE): 1,000 ppm

The product(s) listed on the SDS does not contain REACH substances of very high concern (SVHC), according to the European Chemical Agency (ECHA). Certain products may contain nickel, which has been issued a REACH restriction. However, the restriction is not applicable due to the nature of this product.

SECTION 16: OTHER INFORMATION

SDS Issued By:	MITGI
Information Contact:	info@mitgi.us
Original Date of Preparation:	May 19, 2019
Revision:	June 11, 2019

Abbreviations and Acronyms:

ANSI	American National Standards Institute
BAF	Bioaccumulation Factors
BCF	Bio concentration Factors
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
CLP	Classification, Labeling and Packaging
CSA	Chemical Safety Assessment (REACH)
CSR	Chemical Safety Report (REACH)
DOT	US Department of Transportation
DSL	Canadian Domestic Substance List
EPA	Environmental Protection Agency
EU	European Union
GHS	Globalized Harmonization System
HMIS	Hazardous Material Identification System
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IDLH	Immediately Dangerous to Life or Health
NFPA	National Fire Protection Association
NTP	National Toxicology Program
OECD	Organization for Economic Cooperation and Development
OPPTS	Office of Pollution Prevention and Toxins
OSHA	US Occupational Safety and Health Administration
NIOSH	US National Institute for Occupational Safety and Health Administration
PBT	Persistent, Bio accumulative, Toxic (REACH)
PPE	Personal Protective Equipment
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
SDS	Safety Data Sheet
STOT	Specific Organ Toxicity
STOT RE	Specific Organ Toxicity, Repeated Exposure
SVHC	Substance of Very High Concern (REACH)
TLV	Threshold Limit Value
vPvB	Very Persistent, Very Bio accumulative (REACH)
WHMIS	Workplace Hazardous Materials Information System



Users Responsibilities: This SDS provides information consistent with recommended applications of these products and anticipated activities involving the product. It is the user's responsibility to identify and protect against health and safety hazards presented by modification of hardmetal powders and products after manufacture. Individuals handling hardmetal powders should be informed of all relevant hazards and recommended safety precautions, and should have access to the information contained in this SDS>.

Disclaimer: MITGI has attempted to provide the most current and accurate information in order to satisfy the requirements pursuant of 29 CFR 1910.1200, and the SDS is intended for industrial use only by our customers. MITGI makes no representations regarding the accuracy or completeness of the information contained herein, and assumes no liability or responsibility in connection with the information contained herein for any loss, damage, injury of any kind including death which may result from or arise out of the use, misuse or sole reliance on this information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. The buyer assumes all risk in connection with the use and handling of the products and materials. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release; and is not to be considered a warranty or quality specification.