

MATERIAL SAFETY DATA SHEET

1. Chemical and Manufacturer Information

1.1 Product Name

Cemented Carbide, Coated Cemented Carbide and Cemented Carbide Tools

1.2 Company Information

Company Name : AXISMATERIA. LTD.
Address : 1, Takumidai, Ono-city, Hyogo, 675-1322, Japan
Phone No. : +81-794-62-8535
Fax No. : +81-794-62-8536

1.3 Chemical Family : Refractory Metal Carbide

2. Hazards Identification

2.1 Danger from Fire

Cemented carbide is non flammable when it is in a solid state, thus there is no chance to be a cause of fire. However dust from grinding has the possibility of spontaneous ignition or explosion. Flash point, flammable limits and explosion limits have not been found.

2.2 Toxicity

There is the possibility of irritation when dust from grinding contacts the skin or eyes .
It is reported that repetition or long periods in contact with of cobalt and nickel, may influence the to skin, respiratory organs, heart, etc.

2.3 Environmental Impact

Cobalt, one of the ingredients, may be hazardous to the environment.
In particular, pay attention to its impact on aquatic organisms.

2-4. GHS classification

Not applicable

2-5. GHS label element

Not applicable

3. Composition / Information on Ingredients

※ Cemented Carbide can be coated with the following materials:

AlN, Al₂O₃, (Al,Ti)N, B₄C, Cr₃C₂, CrN, MoS₂, Ti(B,C,N), TiC, (Ti,Zr)N, WC

※ Distinction of a single product or mixture : Mixture (Alloy)

Main ingredients and Contents

Material	Chemical Formula	CAS No.	Classification No. by PRTR Law	Enforcement Serial No. by Industrial Safety and Health Laws	Weight % of ingredients
Tungsten Carbide	WC	12070-12-1	Not applicable	Not applicable	55-95
Molybdenum Carbide	Mo ₂ C	12069-89-5	Class 1-No.453 Attached	No. 9-603 Table	0-70
Tantalum Carbide	TaC	12070-06-3	Not applicable	Not applicable	0-20
Niobium Carbide	NbC	12069-94-2	Not applicable	Not applicable	0-20
Titanium Carbide	TiC	12070-08-5	Not applicable	Not applicable	0-20
Tantalum Nitride	TaN	-	Not applicable	Not applicable	0-15
Titanium Nitride	TiN	25583-20-4	Not applicable	Not applicable	0-5
Zirconium Nitride	ZrN	-	Not applicable	No. 9-313 Table	0-5
Zirconium Carbide	ZrC	12070-14-3	Not applicable	No. 9-313 Table	0-5
Vanadium Carbide	VC	12070-10-9	Class 1-No.321 Attached	Not applicable	0-5
Cobalt	Co	7440-48-4	Class 1-No.132 Attached	No. 9-172 Table	0-30
Nickel	Ni	7440-02-0	Class 1-No.308 Attached	No. 9-418 Table	0-30
Chromium	Cr	7440-47-3	Class 1-No.87 Attached	No.9-142 Table	0-5

* Please contact our department when the more detailed percentage of the ingredients is required.

4. Emergency and First Aid Procedures

4.1 Inhalation

If high concentrations are inhaled or the worker exhibits trouble breathing (cough, pant, etc), remove to fresh air. If breathing is difficult, administer oxygen.

If breathing has stopped, try artificial respiration. Seek immediate medical attention.

If irritation or a rash is continuous for a long period , seek medical attention.

4.2 Skin Contact

When grind dust contacts the skin, remove the contaminated clothes and clean the skin with soap and water. If irritation or a rash is continuous for a long period , seek medical attention.

4.3 Eye Contact

When ground dust gets in eye flush with running water. If the irritation persists , seek medical attention.

4.4 Ingestion

When a large volume of dust is swallowed drink plenty of water to dilute and seek immediate medical attention.

5. Fire Procedures

5.1 Fire Extinguisher

When ignition of grinding dust occurs , use dry sand, dry muscovite, ABC type (for general, oil and electricity fire) powder fire extinguisher or water, but when the dust contains light metals for example magnesium or aluminum, do not use water.

5.2 Unusual Fire and Explosion

If dust from grinding is in a special condition, for example it has a very small particle size and is mixed with low flash point grinding oil, it might spontaneous ignite. If this dust in this condition is then sprayed in the air it might reach the explosion point.

5.3 Fire fighter's protection

Use dust-proof mask or self contained breathing apparatus.

6. Spill and Leak Procedures

6.1 Attention to the Human Body

Clean-up personnel should wear personal protective equipment including respiratory protection which is appropriate for the magnitude of exposure.

6.2 Attention to the Environment

Dust must be treated as an industrial waste and must not leak to the water system.

6.3 Removal Procedures

For removal of dust from the grinding and machining operation, isolate area and do not walk through else material will get scattered. Remove dust using a vacuum equipped with a filter sufficient to remove metal dust and prevent their circulation (a high efficiency particulate air (HEPA) filter is recommended). If an appropriate vacuum is unavailable, use mist, a wet dust mop or another wet clean-up method to remove the dust.

7. Handling and Storage

7.1 Handling

Cemented carbide is stable thus there is almost no effect to the human health, but long time or repetitive contact to dust or grinding liquid which contains cobalt and nickel, may damage the skin. When grinding or machining cemented carbides cobalt and nickel contained dust may be dispersed, use extraction to minimize the dust exposed to workers. Remove ground sludge as well as dust. Wash hands thoroughly before eating, drinking and smoking. Do not eat, drink and smoke in the cemented carbide handling area.

A periodic medical check-up is recommended.

7.2. Storage

Avoid drastic changes of temperature and high humidity.

Provide local exhaust ventilation system, or use respiratory protective equipment and/or dust mask to maintain suspended dust particles concentration level, below the limits shown in the following table.

8. Exposure Controls and Personal Protection

Use a dust protective mask and a respirator, and set up local exhaust ventilation to prevent airborne dust which exceeds the permissible level on the following table.

8.1 Permissible exposure limit in working environments

Ingredients	Chemical formula	*OSHA PEL	**ACGIH TLV	***JOSH OLEs
		mg/m ³	mg/m ³	mg/m ³
		(Concentration of metal dust particles)	(Concentration of metal dust particles)	(Concentration of metal dust particles)
Tungsten Carbide	WC	N/A	5	****N/A
Molybdenum Carbide	Mo ₂ C	15	10	N/A
Tantalum Carbide	TaC	5	5	N/A
Niobium Carbide	NbC	5	5	N/A

Titanium Carbide	TiC	5	5	N/A
Tantalum Nitride	TaN	N/A	N/A	N/A
Titanium Nitride	TiN	N/A	N/A	N/A
Zirconium Nitride	ZrN	N/A	N/A	N/A
Zirconium Carbide	ZrC	15	5	N/A
Vanadium Carbide	VC	N/A	N/A	N/A
Cobalt	Co	0.1	0.02	0.05
Nickel	Ni	1	1.5	1
Chromium	Cr	1	5	0.5

*OSHA: Occupational Safety and Health Administration U.S. Department PEL: Permissible Exposure Limit.

**ACGIH: American Conference of Governmental Industrial Hygienists Inc. TLV: Threshold Limit Value

***JSOH: Japan Society for Occupational Health

****N/A : Not Applicable

8.2 Respiratory protection

It is recommended to wear respiratory protective equipment or dust mask for protection against dust.

8.3 Hands protection

It is recommended to wear protective gloves for protection against dust.

8.4 Eye protection

It is recommended to wear protective glasses or chemical safety goggles for protection against dust.

8.5 Skin and body protection

Avoid direct contact of dust with skins.

In order to remove attached dust, do not shake off clothes or pieces of cloth, but be sure to remove dust by laundering or absorbing with a vacuum cleaner with suitable filters. Change contaminated clothes to clean clothes. It is recommended to use local exhaust ventilation system.

9. Physical and Chemical Properties

Appearance/Odor	Dark Gray, No Odor
Boiling Point	Unknown
Vapor Pressure (mmHg)	Unknown
Vapor Density (Air=1)	Unknown
Water Solubility	Insoluble
Specific Gravity (H ₂ O=1)	11.0—15.5
Volatile Component	0
Evaporation Rate	Unknown

*The color can change with coating materials.

10. Stability and Reactivity

10.1 Stability

This product is stable under normal use conditions.

10.2 Conditions to be avoided

Oxidizing substances (Hydrogen peroxide, Nitric acid, Ammonium nitrate, Nitrogen dioxide, etc.)

Others (Hydrazine nitrate, Acetylene, etc.)

10.3 Hazardous and harmful decomposition products

None

11. Toxicological Information

11.1 Acute Toxicity

Data of Products: No data available

11.2 Skin Corrosion / Irritation

Data of Products: No data available

11.3 Serious Eye Damage / Irritation

Data of Products: No data available

11.4 Respiratory or Skin Sensitization

Data of Products: No data available

11.5 Germ Cell Mutagenicity

Data of Products: No data available

11.6 Carcinogenicity

Data of Products: No data available

11.7 Reproductive Toxicity

Data of Products: No data available

11.8 Specific Target Organ / Systemic Toxicity (Single Exposure)

Data of Products: No data available

11.9 Specific Target Organ / Systemic Toxicity (Repeated Exposure)

Data of Products: No data available

11.10 Aspiration Hazard

Data of Products: No data available

12. Ecological Information

12.1 Mobility

It moves in dust form, however it has high specific gravity then it has tendency to be piled up.

12.2 Persistence / Degradability

There has been no evidence of persistence for cemented carbide.

12.3 Bioaccumulation

There has been no evidence of bioaccumulation for cemented carbide.

12.4 Environmental impacts / Ecotoxicity

There has been no evidence of ecotoxicity for cemented carbide.

Cobalt or nickel may be harmful to the environment. Precaution is especially required to the environmental impact of aquatic organism. (Literature number 2)

13. Disposal Consideration

Method for safe and environmental preferred disposal:

The main materials, such as tungsten and cobalt, are rare metals, and should be collected and recycled.

In the case of disposal, it must be handled, based on Waste Disposal and Public Cleaning Law. (Domestic Law)

14. Transport Information

No data available on code and classifications according to international regulations for transport, regarding the description of this MSDS.

There are no restrictions concerning domestic or oversea transportation.

In case of transportation, the products are sure to be loaded so that the containers will not fall, break or corrode.

Take care of handling because sharp edges might cause external injuries.

15. Regulatory Information (Japanese Applicable Law)

▪ PRTR Law

[Cobalt, nickel, chromium, vanadium and molybdenum are Class 1-designated chemical substances. Preparation of MSDS is obligatory.: Ministry of Economy, Trade & Industry, Ministry of Environment]

▪ Occupational Safety & Health Administration Law.

[Preparation of MSDS is obligatory.: Ministry of Health, Labor & Welfare]

16. Other Information

16.1 Other hazard and toxicity information

When grinding this product, regarding dust or fumes to generate, the following cautions are required.

- Dust or fumes from grinding this product can cause irritation of the nose, mouth, throat, eye mucosa, upper respiratory tract and lungs when inhaled.
Symptoms of overexposure include allergic dermatitis, productive cough, wheezing, shortness of breath, and chest tightness, etc.
- Ingestion of the dust containing high levels of cobalt may cause damage of the blood, heart, thyroid gland and spleen. (References: 1)
- Recent studies indicate that the repeated inhalation or long term contact of cobalt or nickel or chromium metal may affect the skin, respiratory organs, heart, etc. (References: from 2 to 5)

Although there is no carcinogenic knowledge about cemented carbide, there is the following knowledge about a raw powder, and composition metal component.

• Cobalt metal with tungsten carbide:

IARC Group 2A : probably carcinogenic to humans (Reference 6)

• Metallic Cobalt

ACGIH Group A3 : carcinogenic in animals, but the relevance to humans is unknown
IARC Group 2A : possibly carcinogenic to humans

JSOH Group 2B : possibly carcinogenic to humans
(the substance whose evidence is not comparatively enough)

• **Metallic Nickel**

ACGIH Group A3 : not suspected as a human carcinogen
IARC Group 2B : possibly carcinogenic to humans
JSOH Group 2B : possibly carcinogenic to humans
(the substance whose evidence is not comparatively enough)

• **Metallic Chromium**

IARC Group 3 : not classifiable as to its carcinogenicity to humans

*ACGIH: American Conference of Governmental Industrial Hygienists Inc.

*IARC: International Agency for Research on Cancer

*JSOH: Japan Society for Occupational Health

Although there is no knowledge of environmental impact about a cemented carbide, there is the following knowledge about composition metal component.

Cobalt and chromium may be potentially hazardous to the environment. Particular attention is required regarding the effect to the aquatic organism.

16.2 Notes on the following descriptions

The details in this MSDS have been based on our best investigation and evidences of April 9th 2003. The information may be revised according to new evidences, test etc., however, the accuracy and safety of the information are not a guaranteed value.

All chemical agents may contain unknown harmful substances: therefore, the companies and operators, using this MSDS, are requested to take appropriate actions according to their own conditions on their own responsibility.

* Homepage of Ministry of Economy, Trade & Industry : <http://www.meti.go.jp/>

* Homepage of Ministry of Environment : <http://www.env.go.jp/>

* Homepage of Ministry of Health, Labor & Welfare : <http://www.mhlw.go.jp/>

* Supplier of ICSC Cards : <http://www.nihs.go.jp/ICSC/>

16.3 Literature reference

- 1) Food & Drug Research Laboratories, Study No.8005B (4.11.84).
- 2) T. Shirakawa et al., Chest.95.29 (1989).
- 3) International Chemical Safety Cards (cobalt, chromium, nickel).
- 4) Danger and hazardous property handbook of a chemical substance (Japan Industrial Safety & Health Association).
- 5) A.O.Bech et al., Brit.J.Ind.,19,239 (1962).
- 6) IARC Monographs on the Evaluation of Calcinoenic Risks to Humans, vol.86 (2006).