

Material Safety Data Sheet (MSDS)

1.Product and Company Identification

Product Name: Cemented carbide, coated cemented carbide and cemented carbide tools

Information on the Company

Company Name: Hitachi Tool Engineering, Ltd.

Address: 4-1-13 Toyo, Koutou-Ku, Tokyo 135-8365, Japan

Responsible Division: Quality Guarantee Center

Telephone No.: 81-3-3615-5471

Fax No.: 81-3-3615-5498

Emergency Contact: Narita Plant Quality Guarantee Center

Date of Description: April 9,2003

Date of Revision: August 1, 2005

Reference No.:

Chemical Family: Refractory Metal Carbide

2.Composition/ Information on Ingredients

Cemented carbide can be coated with the following materials:

AlN,Al₂O₃, (Al,Ti)N, CrN, Ti(B,C,N), (Ti,Zr)N, (Ti,Si)N etc

Concentration: Compost

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
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
Titanium Nitride	TiN	25583-20-4	Not applicable	Not applicable	0-5
Zirconium Carbide	ZrC	12070-14-3	Not applicable	No. 9-312 Table	0-5
Vanadium Carbide	VC	12070-10-9	Not applicable	Not applicable	0-5
Molybdenum Carbide	Mo ₂ C	12069-89-5	Class 1-No.346 Attached	No. 9-601 Table	0-5
Cobalt	Co	7440-48-4	Class 1-No.100 Attached	No. 9-173 Table	0-30
Nickel	Ni	7440-02-0	Class 1-No.231 Attached	No. 9-417 Table	0-30
Chromium	Cr	7440-47-3	Class 1-No.68 Attached	No.9-143 Table	0-5

* Please contact the responsible division when the more detailed percentage of the ingredients is required.

* The above-listed substances do not correspond to poisonous, deleterious and specified deleterious substances defined in the Poisonous and Deleterious Substances Control Law

3. Hazards Identification

Hazard

- 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.

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 cobalt and nickel, may influence the skin, respiratory organs, heart, etc.

Environmental impact

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

4. First Aid

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.

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.

Eye contact

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

Ingestion

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

5. Fire Procedures

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.

Abnormal 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 spontaneously ignite. If this dust in this condition is then sprayed in the air it might reach the explosion point.

Fire fighter's protection

- Use dust-proof mask or self contained breathing apparatus.

6. Spill And Leak Procedures

Attention to the human body

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

Attention to the environment

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

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. Caution For Handling And Stock

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.

Stock

- Avoid drastic changes of temperature and high humidity.

8. Exposure Protection And Its Equipments

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.

Permissible exposure limit in working environments (Literature numbers 1,3 & 4)

Ingredients	Chemical formula	*OSHA PEL mg/m ³ (Concentration of metal dust particles)	**ACGIH TLV mg/m ³ (Concentration of metal dust particles)	***JSOH OLEs mg/m ³ (Concentration of metal dust particles)
Tungsten Carbide	WC	5	5	****N/A
Tantalum Carbide	TaC	5	5	N/A
Niobium Carbide	NbC	5	5	N/A
Titanium Carbide	TiC	5	5	N/A
Titanium Nitride	TiN	N/A	N/A	N/A
Zirconium Carbide	ZrC	15	5	N/A
Vanadium Carbide	VC	N/A	N/A	N/A
Molybdenum Carbide	Mo ₂ C	15	10	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.

Respiratory protection

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

Hands protection

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

Eye protection

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

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, odorless solid
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. Reactivity And Safety

Stability

This product is stable under normal use conditions.

Conditions to be avoided

Oxidizable substances (hydrogen peroxide, fluorinated material, iodide, basic oxide, nitric oxide etc.)

Other materials (hydrazine, acetylene, ammonia etc.)

Hazardous and harmful decomposition products:

None

11. Toxicological Information

Acute toxicity

- Dust or mist from grinding can cause irritation of nose, mouth, throat, eye, respiratory organs, including the lungs. Symptoms include an allergic skin rash, coughing, wheezing, shortness of breath, chest tightness, etc. Ingestion of significant amounts of dust including cobalt and nickel, has the potential for causing blood, heart, thyroid gland and spleen problems. (Literature number 1)

Local effect, sensitization

- Sensitivity to repeated or prolonged contact with cobalt, nickel and chromium particulate matter can cause skin irritation. (Literature number 2)

Chronic toxicity

- Repetition or long time inhalation or exposure of cobalt and nickel, may cause asthma. (Literature number 2,3,4)

- Repetition or long time inhalation or exposure of cobalt, nickel and chromium, may cause lungs illness. (Literature number 2)

- Repetition or long time inhalation or exposure of cobalt and nickel, may effect to heart and may cause myocardium infarction. (Literature number 2,5)

- There are some reports that hyperuricemia and gout were caused by molybdenum. As to inhalation toxicity, pneumoconiosis was reported to be caused at workplaces where metallic molybdenum and molybdenum oxide are handled.

Carcinogenicity

- There has been no evidence of carcinogenicity for cemented carbides.
- Refer to the table below for the evaluation of the ingredients.

	ACGIH	*IARC	JSOH
Cobalt	A3	2B	2B
Nickel	A5	2B	2B
Chromium	A4	3	—

ACGIH: GroupA3 Animal carcinogen.

GroupA4 Not classifiable as human carcinogen.

GroupA5 Not suspected as human carcinogen.

IARC: Group 2B Possibly carcinogenic to humans.

Group 3 Not classifiable as to carcinogenicity to humans.

JSOH: Group 2B Possibly carcinogenic to humans.

*IARC: International Agency for Research Cancer

“Warning: This product contains or produces a chemical(s) known to the State of California to cause cancer, such as cobalt (7440-48-4) . (Proposition 65, California Health and Safety Code Section 25249.5 et seq.)

12. Ecological information

Mobility:

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

Persistence/Degradability

- There has been no evidence of persistence for cemented carbide.

Bioaccumulation

- There has been no evidence of bioaccumulation for cemented carbide.

Environmental impacts/ Ecotoxicity

- There has been no evidence of ecotoxicity for cemented carbide.
- Cobalt may be harmful to the environment. Precaution is especially required to the environmental impact of aquatic organism. (Literature number 3)

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 laws)

- PRTR Law

[Cobalt, nickel, chromium 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)

- Poisonous and Deleterious Substances Control Law.

- Law concerning Examination and Regulation of Manufacture and Handling of Chemical Substances.

16. Other Information

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/>

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 (English version, Japanese version)

(4) A.D. Bech et al., Brit. J. Ind. Med., 19, 239 (1962)

(5)Japan Advanced Information Center of Safety and Health

Documents concerning hazard and toxicity of chemical substances/

Substances to be notified based on Article 57.2 of Occupational Safety & Health

Administration Law

(Model MSDS information)

(6)Japan Society for Occupational Health

Recommendation of Occupational Exposure Limits(2004)/ Occupational carcinogens(2004)

(7) U.S.Department of Labor Occupational Safety & Health Administration

Regulations (Standards-29 CFR)/ TABLE-1 Limits for Air Contaminants.

-1910.1000 TABLE Z-1(OSHA PEL)

Emergency Contact.: Narita Plant Quality Guarantee Center

Telephone No.: 81-476-1445