

## Safety Data Sheet (SDS)

Date of Issue: 27<sup>th</sup> April, 2012Date Revised: 1<sup>st</sup> April, 2021

### 1. Identification of the Substance/Preparation and of the Company

#### Product

Chemical Name: Polycrystalline Diamond (PCD) tool and Cemented Carbide base metal

#### Supplier Information:

Company Name: NGK SPARK PLUG CO., LTD.  
 Contact Department: Machining Technology Company  
 Address: 2808 Iwasaki, Komaki-shi, Aichi, Japan <485-8510>  
 Telephone Number: +81-568-76-1270  
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#### Recommended Use and Restrictions on Use

Cutting tools mainly for metallic materials

### 2. Hazard Identification

#### The GHS Classification

Some data (such as the burning rate test data, etc.) for the dust, fume or vapor which occur from PCD/Cemented Carbide producing process are unavailable. Therefore, they are not be classified by GHS.

In here, GHS classification of the each metallic ingredients (cobalt, nickel and chromium) for composing the PCD/Cemented Carbide can be disclosed. In addition, other hazards and harmful effects (for health, environment, physical and chemical) which are not listed are unclassifiable or non-applicable by GHS.

GHS classification for the hazards of cobalt alone in below,  
 (When cobalt is included as ingredients of PCD/Cemented Carbide.)

Health Hazard	<ul style="list-style-type: none"> <li>• Respiratory sensitization</li> <li>• Skin sensitization</li> <li>• Carcinogenicity</li> <li>• Reproductive toxicity</li> <li>• Specific target organ toxicity (Single exposure)</li> <li>• Specific target organ toxicity (Repeated exposure)</li> </ul>	Category1 Category1 Category2 Category2 Category3 (Respiratory tract irritation) Category1 (Respiratory)
Environmental Hazard:	• Hazardous to the aquatic environment	Category4

GHS classification for the hazards of nickel alone in below,  
 (When nickel is included as ingredients of PCD/Cemented Carbide.)

Health Hazard	<ul style="list-style-type: none"> <li>• Respiratory sensitization</li> <li>• Skin sensitization</li> <li>• Carcinogenicity</li> <li>• Specific target organ toxicity (Single exposure)</li> <li>• Specific target organ toxicity (Repeated exposure)</li> </ul>	Category1 Category1 Category2 Category1 (Respiratory tract irritation) Category1 (Respiratory)
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Environmental Hazard:	• Hazardous to the aquatic environment	Category4
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GHS classification for the hazards of chromium alone in below,  
(When chromium is included as ingredients of PCD/Cemented Carbide.)

Health Hazard	<ul style="list-style-type: none"> <li>• Serious eye damage</li> <li>• Respiratory sensitization</li> <li>• Skin sensitization</li> <li>• Germ cell mutagenicity</li> <li>• Specific target organ toxicity (Single exposure)</li> <li>• Specific target organ toxicity (Repeated exposure)</li> </ul>	Category2B Category1 Category1 Category2 Category2 (Respiratory tract irritation) Category3 (Respiratory)
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**GHS Label Elements**

GHS label elements of the each metallic ingredients (cobalt, nickel and chromium) for composing the PCD/Cemented Carbide can be disclosed in below.

	Cobalt	Nickel	Chromium
Hazard Pictograms :			
Signal Words :	Danger		
Hazard Statements :	<ul style="list-style-type: none"> <li>• Risk of causing allergies, asthma or breathing difficulties if inhaled.</li> <li>• Risk of causing an allergic skin reaction.</li> <li>• May cause cancer.</li> <li>• May cause adverse effects on fertility or the unborn child.</li> <li>• Risk of respiratory irritation.</li> <li>• Cause of respiratory failure due to long-term or repetitive exposure.</li> <li>• May be harmful to aquatic life due to long-term effects</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of causing allergies, asthma or breathing difficulties if inhaled.</li> <li>• Risk of causing an allergic skin reaction.</li> <li>• May cause cancer.</li> <li>• Respiratory and kidney disorders</li> <li>• Cause of respiratory failure due to long-term or repetitive exposure.</li> <li>• May be harmful to aquatic life due to long-term effects</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of causing allergies, asthma or breathing difficulties if inhaled.</li> <li>• Risk of causing an allergic skin reaction.</li> <li>• Suspected of causing genetic disease</li> <li>• Failure to systemic toxicity</li> <li>• Risk of respiratory irritation.</li> </ul>
Precautionary Statements :	<p><b>【Prevention】</b></p> <ul style="list-style-type: none"> <li>• Obtain safety instructions* before use.</li> <li>• Do not handle until all safety precautions have been read and understood.</li> <li>• Use appropriate personal protection and ventilation system keeping away from exposure.</li> <li>• Wear suitable protective gloves.</li> <li>• When insufficient ventilation, wear respirator as required.</li> </ul>		

<ul style="list-style-type: none"> <li>• Do not breathe dust, fume or vapor.</li> <li>• Do not eat, drink or smoke in handling area.</li> <li>• Wash skin thoroughly after handling.</li> <li>• Do not release into the environment.</li> </ul> <p><b>【Responses】</b></p> <ul style="list-style-type: none"> <li>• If inhaled, move to fresh air and take a rest with posture easy to breathe.</li> <li>• If respiratory symptoms occurs, contact a doctor.</li> <li>• When feeling ill, get medical advice/attention.</li> <li>• Take off contaminated clothing and wash before reuse.</li> <li>• If on skin, rinse away immediately with a large amount of water and soap.</li> <li>• If skin irritation occurs, contact a doctor and get medical advice/attention.</li> <li>• If exposed or concerned, get medical advice/attention.</li> <li>• If dust is in eyes, immediately wash away with clean water (remove the contact lenses if possible). If irritation persists, get medical advice/attention.</li> <li>• If a large amount of dust is swallowed, get medical advice/attention after ingesting plenty of water to dilute.</li> </ul> <p><b>【Storage】</b></p> <ul style="list-style-type: none"> <li>• Avoid sudden changes of temperature and high humidity for storage.</li> </ul> <p><b>【Disposal】</b></p> <ul style="list-style-type: none"> <li>• Dispose of contents/container to an approved waste disposal plant under the laws.</li> </ul>
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\*For safety instructions, refer to the Japan Cutting & Wear-resistant Tool Association website (<http://www.jta-tool.jp/>) .

### 3. Composition/Information on Ingredients

- Distinction between Substance and Mixture : Mixture
- Ingredients and Concentration or Concentration Range (Composition)

Ingredient	Chemical Formula	CAS No	Composition mass%
PCD layer			
Carbon	C	7440-44-0	30-95
Tungsten carbide	WC	12070-12-1	0-70
Cobalt	Co	7440-48-4	10-30
Cemented Carbide base metal			
Tungsten carbide	WC	12070-12-1	55-100
Tantalum carbide	TaC	12070-06-3	0-20
Niobium carbide	NbC	12069-94-2	0-20
Titanium carbide	TiC	12070-08-5	0-20
Titanium nitride	TiN	25583-20-4	0-5
Vanadium carbide	VC	12070-10-9	0-5
Cobalt	Co	7440-48-4	0-30
Nickel	Ni	7440-02-0	0-30
Chromium	Cr	7440-47-3	0-5

## 4. First-Aid Measures

### If Inhaled

- If the high concentration of dust from grinding scraps is inhaled or respiratory symptoms (coughs, gasping, shortness of breath, etc.) are experienced, evacuate and isolate the workplace. If breathing difficulties occur, administer oxygen inhalation. If breathing has stopped, immediately administer artificial respiration and get medical advice/attention.
- If irritation or rash persists, get medical advice and attention.

### If on Skin

- If dust from grinding scraps is contacted with skin, take off contaminated clothing and rinse the affected area with soapy water thoroughly. If irritation or rash persists, get medical advice/attention.

### If in Eyes

- If dust from grinding scraps is in eyes, immediately wash away with clean water. If irritation persists, get medical advice/attention.

### If Swallowed

- If a large amount of dust is swallowed, get medical advice/attention after ingesting plenty of water to dilute.

## 5. Fire-Fighting Measures

### Extinguishing Media

- To extinguish the fire of dusts resulting from grinding, use dry sand, dry dolomite, ABC type (general, oil, electric fire) powder extinguishers or water (no water allowed for the dust containing cut powders of light metal such as magnesium and aluminum).

### Unusual Fire and Explosion

- Dusts resulting from grinding are very fine and under the specific conditions in which the dusts are mixed with grinding oil with low flash point, it is possible to become pyrophoric. If dusts under very flammable conditions are dispersed in the air, it is possible to explode. In such cases, look to your own safety first and then take necessary fire-fighting measures.

### Special Protective Actions for Fire-Fighters

- In fighting a fire, wear a dust-proof respirator or respiratory protective equipment.

## 6. Accidental Release Measures

### Personal Precautions

- It is recommended that someone who cleans grinding scraps or dusts should wear clothing and respiratory protective equipment to minimize exposure.

### Environmental Precautions

- Dispose of dusts as industrial wastes and prevent release in water systems.

### Cleaning Up Methods

- If there are dusts from resulting from grinding and mechanical processing, isolate the area and remove with a cleaner equipped with a filter which can take up fine particles very efficiently. If appropriate removing methods are not available, sweep with water sprayers or wet mops.

## 7. Handling and Storage

### Handling

- PCD and Cemented Carbide are stable and has little effect on health. However prolonged or repeated exposure to the dust or grinding liquid containing cobalt or nickel may cause rough skin.
- In grinding or mechanical processes, provide local exhaust ventilation and use personal protective equipment to minimize exposure to human body, due to the possibilities of

the disperse of dust containing cobalt or nickel. Do the same way for grinding sludge.

- Wash hands thoroughly before eating, drinking, and smoking. Do not eat, drink, and smoke in the handling area.
- Regular physical checkups are recommended.

**Storage**

- Avoid sudden changes of temperature and high humidity for storage.

**8. Exposure Controls/Personal Protection**

Provide local exhaust ventilation so that dusts in the air may not exceed the exposure limits in the following table. If it is possible that a concentration may exceed the permissible level, use a dust-proof respirator or respiratory protection.

Permissible Concentration in Working Environment

Ingredient	Chemical Formula	OSHA* PEL* mg/m <sup>3</sup> (Metal Dust Concentration)	ACGIH* TLV* mg/m <sup>3</sup> (Metal Dust Concentration)	Japan Society for Occupational Health Exposure Limit mg/m <sup>3</sup>
PCD layer				
Carbon	C	N/A	N/A	N/A
Tungsten carbide	WC	N/A	5 (as W)	N/A
Cobalt	Co	0.1	0.02	0.05
Cemented Carbide base metal				
Tungsten carbide	WC	N/A	5 (as W)	N/A
Tantalum carbide	TaC	N/A	N/A	N/A
Niobium carbide	NbC	N/A	N/A	N/A
Titanium carbide	TiC	N/A	N/A	N/A
Titanium nitride	TiN	N/A	N/A	N/A
Vanadium carbide	VC	N/A	N/A	N/A
Cobalt	Co	0.1	0.02	0.05
Nickel	Ni	1.0	1.5	1.0
Chromium	Cr	1.0	0.5	0.5

- \*OSHA : Occupational Safety & Health Administration U.S. Department
- \*PEL : Permissible Exposure Limit
- \*ACGIH : American Conference of Governmental Industrial Hygienists Inc.
- \*TLV : Threshold Limit Value
- \*N/A : Not Applicable

**Protective Equipment**

- Respiratory Protection: Dust-proof respirators and respiratory protective equipment are recommended.
- Hand Protection: Protective gloves for dusts are recommended.
- Eye Protection: Protective glasses for dusts are recommended.
- Skin/Body Protection: Avoid direct skin contact.  
Clean up deposited dust on clothing, rags, etc. by washing or absorbing with suitable filters but not by whisking off.  
Change the contaminated clothing into clean one.  
Local exhaust ventilation is recommended.

## 9. Physical and Chemical Properties

Appearance:	Dark gray solid
Odor:	Odorless
pH:	No data available
Melting Point:	
Boiling Point:	No data available
Flash Point:	No data available
Vapor Pressure:	No data available
Specific Gravity:	11.0 – 15.5
Solubility:	Insoluble

## 10. Stability and Reactivity

### Reactivity

- Can be a possible cause to produce harmful gases in contact with chemical such as acid.

### Chemical Stability

- This product is in solid form and therefore chemically stable as it is and not explosive, flammable, combustible, pyrophoric, water-reactive, and oxidizing in normal environment.

### Possibility of Hazardous Reactions

- Not applicable

### Conditions to Avoid

- Contact with the following 'Incompatible Materials'

### Incompatible Materials

- Oxidizing substances (Hydrogen peroxide, Nitric acid, Ammonium nitrate, Sodium chlorate, Nitrogen dioxide, etc.)
- Other substances (Hydrazine nitrate, Acetylene, Performic acid, Bromine pentafluoride, 1,4-Dioxane, etc.)

### Hazardous Decomposition Products

- None

## 11. Toxicological Information

### Acute Toxicity

Data on this product: No data available

### Skin Corrosion/Irritation

Data on this product: No data available

### Serious Eye Damage/Eye Irritation

Data on this product: No data available

### Respiratory or Skin Sensitization

Data on this product: No data available

### Germ Cell Mutagenicity

Data on this product: No data available

### Carcinogenicity

Data on this product: No data available

### Reproductive Toxicity

Data on this product: No data available

### Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)

Data on this product: No data available

### Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)

Data on this product: No data available

### Aspiration Hazard

Data on this product: No data available

## 12. Ecological Information

### Mobility

- Although dusts in the air are mobile, they are likely to be deposited.

### Persistence

- Not reported on PCD and Cemented Carbide

### Bioaccumulative Potential

- Not reported on PCD and Cemented Carbide

### Environmental Effects

- Not reported on PCD and Cemented Carbide

## 13. Disposal Considerations

### Disposal Method

- Cobalt and nickel are rare metal. It is desirable to collect and recycle them.
- For disposal, conform to the applicable laws regarding industrial wastes such as 'Waste Disposal and Public Cleansing Law' and relevant local by laws.

## 14. Transport Information

UN Number: Not applicable

UN Hazard Class: Not applicable

Marine Pollutant: Not applicable

## 15. Regulatory Information

As this product is an article, laws and regulations prescribed for chemical substances are not applied.

## 16. Other Information

### Other Hazardous Information

The following attention should be paid for dusts resulting from cutting and grinding.

- Dusts resulting from cutting and grinding irritate the mucous membranes of the nose, mouth, throat, and eyes; they also irritate the respiratory organs and lungs. Symptoms include allergic skin rash, and coughs, asthma, shortness of breath, chest pressure and tightness in the chest.
- If a large amount of dust containing cobalt is inhaled, blood, heart, thyroid gland, and spleen disorders may result. (References 1)
- It is reported that repeated or prolonged contact with cobalt, nickel, or chromium may affect skin, respiratory organs, heart, etc. (References 2 – 5)

Although it is not reported that PCD and Cemented Carbide are carcinogenic, the following is reported on raw material powders and metal ingredients.

Metallic cobalt powders with tungsten carbide	IARC	2A: Probably carcinogenic to humans. (References 6)
Cobalt metal	ACGIH	A3: Confirmed animal carcinogen with unknown relevance to humans.
	IARC	2B: Possibly carcinogenic to humans.
	Japan Society for Occupational Health	2B: The substance has been determined to be possibly carcinogenic to humans (with relatively insufficient evidence).
Nickel metal	ACGIH	A5: Not suspected as a human carcinogen.
	IARC	2B: Possibly carcinogenic to humans.
	Japan Society for Occupational Health	2B: The substance has been determined to be possibly carcinogenic to humans (with relatively insufficient evidence).
Chromium metal	IARC	3: Not classifiable as to its carcinogenicity to

humans.

\*ACGIH : American Conference of Governmental Industrial Hygienists Inc.

\*IARC : International Agency for Research on Cancer

Although PCD and Cemented Carbide are unknown about environmental effects, the following is reported on metal ingredients.

- Cobalt and chromium may be harmful to the environment. Special attention should be paid for the effect on aquatic life.

#### Disclaimer

The contents of this MSDS are based on material and information available as of today and may be revised due to knowledge newly obtained. The values of concentration, physical/chemical properties are not guaranteed. In addition, the precautions described herein apply only to normal uses, and thus safety cannot be guaranteed.

#### References

- (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) The Guide to Chemical Hazards (edited by Japan Industrial Safety & Health Association)
- (5) A. O. Bech et al., Brit. J. Ind., 19, 239 (1962).
- (6) IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, vol.86 (2006).
- (7) Data Book for Safety Management of Chemicals (edited by The Chemical Daily Co.)

#### Revision History

Rev.2	1 <sup>st</sup> April, 2021	GHS classification revised. The change of Contact Department Name.
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